

INVESTMENT TRUST COMPANIES

1971 - 1980

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I declare that this thesis has been written by me and that the work is entirely my own.

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A B S T R A C T

Investment Trust Companies represent a significant proportion of the equity capitalisation of the London Stock Exchange. The traditions and development of the sector stretch back for more than 100 years to the last quarter of the 19th century. In addition many Investment Trusts have both strong historical ties with the development of the Scottish financial community and currently occupy central positions in that community.

Our research covers the main characteristics of the Investment Trust sector during the ten years to December 1980 and includes legal and tax points, foreign investment, achieved performance and perhaps inevitably the discount. In addition we examine the concept of financial intermediation with a view to establishing a role for Investment Trusts. Unfortunately our overall conclusion suggests that it is by no means clear that investment Trusts can re-establish and maintain a role as financial intermediaries.

CHAPTER ONE

INVESTMENT TRUST COMPANIES AS FINANCIAL INTERMEDIARIES

Introduction

Section 1 : Financial Intermediation

Section 2 : Investment Trust Company
Intermediation Services

Summary

Appendix : The First Scottish American Trust
Company Limited, 1973-1973.

INTRODUCTION : In this chapter our objective is to establish the services that are supplied by Investment Trust Companies (ITCs) to the financial community. While product identification is comparatively easy to complete for manufacturing and commercial companies the same cannot be said for financial intermediaries in general and ITCs in particular. This is due at least in some measure to the intangibility of asset claims which represent both the inputs and outputs of the financial intermediation process. However in spite of the difficulties the precise identification of the services being provided is a necessary prerequisite to any measure of achieved performance. We deal with this by looking first of all at the characteristics of financial intermediation in general (Section 1). Secondly we apply the results of this analysis to ITCs (Section 2).

1. Financial Intermediation : We start by defining a financial intermediary as an economic unit that issues claims on itself and uses the funds received to purchase claims on other economic units. Thus a bank for example issues claims on itself by accepting customers' deposits and then through lending out the funds deposited acquires claims issued by borrowers. Similarly ITCs issue equities to fund portfolio investment. An important aspect of financial intermediaries is that by definition the demand for their services arises through the joint but differing requirements of various market participants. This is perhaps seen most clearly in our bank example where the differing requirements of lenders and borrowers are reconciled through the bank intermediation function. However we suggest that the same is the case for ITCs.

where the equity holding requirement of investors are reconciled to the wide range of equity claims available on the stock exchange.

Although such definitional points are unexceptional and would be accepted by most commentators a more fundamental concern is why the need for reconciliation between the participants in financial markets arises in the first place. Standard micro-economic theory dealing solely with perfect and frictionless markets provides little insight. In such a world there would be no incentive for an institution to package or re-package claims as market participants could achieve their utility maximising positions without assistance. We are therefore led to hypothesise that the presence of financial intermediaries is due, at least in terms of micro theory, to market imperfections. However we suggest that this interpretation must be used with some caution. In particular care must be taken not to define genuine economic activity, involving both costs and benefits as a market imperfection either because it is not specifically considered by received theory or because although the costs may be obvious the benefits may be subtle and more difficult to quantify. While accepting the possibility that there may well be areas of

imperfection in the workings of the security markets particularly in the field of taxation we suggest that many of the services provided by financial intermediaries are in fact genuine economic activities produced under competitive conditions and should be considered as such.

In order to retain relevance we restrict our analysis of intermediation functions to one financial market namely the equity market. We define the equity market in as broad a manner as possible and where necessary we include within the definition operations involving not only quoted securities but also unquoted. Our approach is not to formally model intermediation roles but rather to determine the areas of economic activity which have an intermediation potential. As we implied above the costs associated with intermediation activities are often more easily identified than the benefits. Our categorisation is therefore on the basis of cost.

Two broad but not mutually exclusive strands of cost can be identified as underlying financial intermediation. The first is based on direct transaction costs while the second centres on information costs and the crucial role that the production and dissemination of information plays in the workings of markets. We deal with each in turn.

- i. Transaction Costs : The presence of a transaction cost function and the possibility that a given transaction may be cheaper for some market participants than for others creates the potential for intermediation. The cost function facing market participants

can be divided into the following four sections -

- tax effects
- scale effects
- broking commissions
- jobbing spreads.

Taxation affects all aspects of saving and investment. Thus savings are made out of taxed income, the purchase of equities is subject to stamp duty, dividends suffer income tax and realized gains are assessed for capital gains tax. The presence of an extremely complex tax framework suggests an intermediation role that through statutory concession or tax planning can provide economically efficient routes to the equity market. Indeed over the last fifteen to twenty years the whole ownership structure of corporate equities has changed reflecting in the main certain statutory tax efficient savings concessions. The result has been an increasing institutionalisation of share ownership as individuals take advantage of the concessions and channel their savings through pension funds or insurance policies. The Wilson Committee identified four key concessions.¹

- (i) The effect of redistributive taxation on the wealthier classes who have now become net sellers of equities.
- (ii) The savings attractions of pension funds resulting from contributions being allowed out of gross income.
- (iii) The investment attractions of pension funds resulting from their tax free status.

1. Committee to Review the Functioning of Financial Institutions. (Wilson Committee). Evidence submitted by the Department of Industry, p.21.

- (iv) The similar although less extensive reliefs than in (ii) and (iii) available to savings and investments via life assurance policies.

The effect of these concessions is described in Table 1(i).

TABLE 1(i)

<u>Ownership of Corporate Securities</u>		
<u>1963 - 1980</u>		
Ownership Group	1963 ²	1980 ²
Individuals and Nominees	65	51
Insurance Companies	10	18
Pension Funds	5	22
Investment Companies	11	9
Other	8	-
	—	—
TOTAL	100	100
	—	—

Ownership statistics are subject to a considerable degree of error. In part this is due to them being based on survey samples. However, a perhaps more contentious area is the assumption that the beneficial owners of nominee holdings are individuals. While there

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2. Wilson Committee, Evidence submitted by the Department of Industry, p.21, and the Stock Exchange Fact Book, December 1981.

is no sure way of identifying nominees the "individuals" assumption based on the belief that nominees are primarily used by fiduciary trusts (e.g. executorship trusts) appears reasonable.

Although we deal in detail with taxation in Chapter 2 we note in passing that the tax concessions which have resulted in the substitution of individual for institutional ownership shown in Table 1(i) are not available to ITCs. Therefore the provision of a tax efficient savings service is a role they are unlikely to fulfil.

While the tax concessions described above have had a major influence on the direction of savings investors' expectations as to future return distributions may be influenced not only by the presence of alternative savings channels but also by the form they receive their investment returns in. Here again taxation plays a major influence. In general the institutions that are favoured by savings tax concessions are also favoured in terms of both their own taxation and in the tax efficiency of the various investment return forms they can offer savers. Therefore to many savers there is an absolute tax advantage covering both savings and returns through choosing to gain access to the equity market by means of a "favoured" institution.

Given the pattern of equity ownership established through tax savings concessions we now ask whether or not the policies that companies adopt to distribute returns influence investors' expectations as to future returns. In particular does the balance between dividend distribution and capital gain influence expected return and

thus equity valuation. Arguments along these lines are usually based on assumed tax clientele effects which turn on the differential taxation of gains and dividends^{3,4,5,6}. Thus for example taxpayers with high marginal rates of tax are considered to prefer their returns in the form of gains which are taxed at a lower and non-progressive rate rather than dividends which are cumulated with taxpayers' other income. Whether or not these effects exist and are quantifiably important is extremely difficult to establish. On the one hand to an individual tax paying equity owner the form of return receipt will certainly influence any tax liability. On the other hand to tax exempt gross funds or pension funds the form of return receipt will have no tax implications. However it may be that the nature of these funds, in particular their asserted need for income to meet regular and committed disbursements, leads to a preference for returns to be in the form of dividends rather than capital gains.

An interesting example of an intermediation vehicle specifically set up to exploit differing shareholder attitudes to return form is the split-level ITC. These ITCs repackage portfolios of claims into income and capital streams. Market participants through purchasing a combination of income and capital shares are effectively able to

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3. E. Elton, M. Gruber, "Marginal Stockholder Tax Rates and the Clientele Effect", *Review of Economics and Statistics*, 52, Part 1, 1970, pp. 68-74.
 4. R. Brealey, "Marginal Investor Tax Rates - A Note. *Investment Analyst*, 43, December 1975.
 5. W. Lewellan, K. Stanley, R. Lease, G. Shalbaum, "Some Direct Evidence on the Dividend Clientele Effect", *Journal of Finance*, December 1978, pp. 1385-1399.
 6. S. Schaefer, "Tax-induced Clientele Effects in the Market for British Government Securities. Placing Bounds on Security Values in an Incomplete Market". *Journal of Financial Economics*, Vol 10, No.2, July 1982, pp. 121-159.

select their own distributional form. Litzenberger and Sosin have described how, if distributional form is important, the welfare of shareholders will increase through the recapitalisation of ordinary closed funds to dual or split-funds.⁷ Although the original purpose of these funds was to exploit the dividend - gains tax differential it may well be as we indicated above that they have developed a role partly based on tax efficient gains for individuals and partly based on the production of dividend streams for institutions where what matters is not tax efficiency but income generation.

Leaving aside tax-based intermediation we move on to consider the second variable underlying the hypothesised transaction cost curve namely scale economies. Scale economies in administration and management may well result from the pooling of investment funds. For example many managers argue that investment research, particularly for small or unquoted companies, is more efficiently produced when it is undertaken for several funds rather than for an individual portfolio. Undoubtedly the presence of management fees ensures that there is an element of self-interest in maintaining this argument. Indeed given the received evidence on fund performance which we deal with below the realization of research efficiencies may well be more potential than actual. However it is interesting to note that common management has increasingly become a feature of the ITC sector. From Table 1(ii) it can be seen that by 1978 nine management groups managed the 68 ITCs which in total accounted for 47% of the sector's managed funds.⁸

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7. R. H. Litzenberger, H. Sosin, "The Performance and Potential of Dual Purpose Funds" *Journal of Portfolio Management*, Spring 1978, pps 56-67.
 8. Touche Remnant & Co., Investment Trust Services, Electra Group Services, /

TABLE 1 (ii)

<u>Investment Trust Management Groups</u>				
<u>1978</u>				
Value of Total Funds Under Management £m	No. of Management Groups	No. of ITCs Managed	No. Funds under Management £m %	
500 and over	2	25	1195	17.9
200 - 500	7	43	1931	29.0
100 - 200	11	46	1769	26.5
50 - 100	16	33	1289	19.3
20 - 50	7	16	229	3.4
10 - 20	15	17	211	3.2
5 - 10	2	2	15	0.2
1 - 5	12	12	29	0.5
Total	72	194	6668	100.0

Notes : 1. Source: Wilson Committee.⁹

Since 1978 the tendency towards management concentration has continued. By December 1980 of the 100 largest ITCs quoted on the stock market twenty were managed by just 2 investment groups namely Investment Trust Services and Touche Remnant & Co., while only 15 could be considered truly independent.

/ Drayton Portfolio Management, John Govett & Co., F and C Management, Murray Johnson, Ivory & Sime and Philip Hill Management.

9. Committee to Review the Functioning of the Financial Institutions, Appendices, p. 451.

The extent to which administrative and management economies can be gained from investment pooling are difficult to quantify precisely. In particular as many management groups provide investment services for a variety of investors including ITCs, unit trust, pension funds and private clients the differing investment objectives of these clients may well restrict the extent to which scale economies can be fully realised. While hesitating to suggest that there is an optimum mix of funds for any particular management group it is interesting to note recent developments in the U.S. involving the splitting of portfolios between different management companies. Perhaps trustees consider that scale economies are advantageous only to the extent that they don't interfere with the investment objectives given to management. Sharpe has recently explored some of the implications of splitting portfolios.¹⁰ Although his paper is exploratory rather than definitive he does seriously question how, given the importance of security covariances in determining portfolio risk, optimal results can be achieved when as a result of the fund being split many of the covariances are in fact ignored.

The third element we identified as underlying the transaction cost function concerns broking commissions. In the U.K. the stock exchange closely controls the terms of brokers' remuneration through the minimum commission system. Under this system broking commissions measured as a percentage of order value are, above a minimum level, a decreasing function of the total transaction value. Therefore substantial cost savings are available to those able to deal in large amounts of individual securities. On the other hand those who deal in small amounts will

10. W. F. Sharpe, "Decentralised Investment Management", *Journal of Finance*, May, 1981, pps. 217-234.

be faced with relatively high commission costs. In the light of modern portfolio theory this latter point will act to reduce the benefits to small investors of any attempts they make to construct their own fully diversified portfolios.

Working together the effects of both a minimum commission level and the sliding scale of rates is to reduce the divisibility of costs associated with security purchase. If these costs are not perfectly divisible then the attainable set of investment opportunities will be an increasing function of investor wealth with those investors at the lower end of the wealth scale being unlikely to reach their chosen points on the efficient frontier. Klein has taken this argument further and suggested that the indivisibilities stem not so much from the costs of trading but from the prices of individual securities.¹¹ He suggests that as securities are available only in terms of fixed denominations the construction of fully diversified portfolios may well be constrained by investor wealth. Given the apparent ease with which scrip or bonus issues can be made indivisibilities at the individual security level are perhaps less important than those market wide ones associated with security trading. Interestingly some support for Klein's hypothesis can be found in the U.S. money market funds. Fraser suggests that one of the intermediation functions provided by these funds is that the pooling of investment funds allows access to certain U.S. Government bonds that are only available in high denominations.¹² However it is important to note that the actual divisibility achieved by these funds is considerably reduced by minimum subscription levels. Similar minimum subscription levels or minimum

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11. M. Klein, "The Economics of Security Divisibility and Financial Intermediation" *Journal of Finance*, 28, No. 4, 1973, pps 923-931.
 12. D. Fraser, "The Money Market Fund as a Financial Intermediary", *M.S.U. Business Topics*, Spring 1977, pps. 5-11.

portfolio sizes exist in the U.K. Thus while the costs of trading may well force small investors to search for an intermediation vehicle the choice of vehicles may be limited to those like unit trusts or ITCs where the minimum investment is the available purchase cost. Unfortunately there is an element of "Catch 22" in this at least for the purchasers of ITC shares. They can only be purchased on the stock exchange where as we noted above the minimum commission level does not favour the small investor!

Although the workings of the minimum commission system imply scale economies we have treated them separately from those related to administration and management for two reasons. First of all they arise from a fundamentally different source. The economies of scale we discussed above are the result of the search for efficient production within a market based pricing system. The scale economies that result from the minimum commission system are based on an imposed or regulatory pricing system. Secondly we wish to highlight minimum commissions because although at first pass they appear to represent market imperfections within the accepted meaning of the term they may well serve an important economic function in relation to information costs which we deal with below.

The final element of transaction costs we consider is the jobbers spread. In stock markets like the London and New York stock exchanges trading is continuous. This method of trading is in sharp contrast to the call system practised on most European exchanges such as the Paris Bourse or the Borsa Valori in Milan. Under the "European" system shares are traded in turn with the price being "called" when the referee considers that a particular price will clear the market.¹³ Trading is directly

13. On the Borsa Valori for example the major broking firms take it in turn to provide the referee.

between brokers acting for their principals without the presence of a market-maker.¹⁴ Once the price has been "called" trading in that particular security is over for the day.

This system is impractical for exchanges with large numbers of securities. Thus in London the alternative system of continuous trading operates. This allows all securities to be traded at any time during and even a little after the official trading hours. The most important characteristic of continuous trading is, following Demsetz, the concept of "immediacy".¹⁵ In other words trading can only be continuous if buyers and sellers can complete their transactions as and when they wish. This "immediacy" or liquidity function is provided on the London stock market by the jobbing system. The cost of providing liquidity is the difference between the price the jobber is willing to buy at (bid) and the higher price he is willing to sell at (ask). This difference is known as the jobbers' spread.

In relation to the jobbers' spread the relevant question to ask is whether or not different investors consistently face different liquidity cost functions. If such a situation exists then the possibility of cost effective intermediation also exists. Interestingly the stock exchange rules governing jobbing competition, the anonymity of ultimate transactors and brokers' inquiries of jobbers' trading terms are to a large extent designed to ensure that different investors don't in fact face different liquidity cost functions.¹⁶ These rules

14. Where brokers can buy and sell on their own account their operations may well be similar to that of a market-maker.

15. H. Demsetz, "The Cost of Transacting", Quarterly Journal of Economics, 82, No. 1, 1968, pps. 33-53.

16. The three rules mentioned ensure respectively that there is a minimum number of two jobbers making a market in any one security, that the only active market participants allowed into the market arena, the floor of the exchange, are brokers and jobbers and that brokers when asking /

as part of the stock exchange's regulatory framework attempt to create a market environment where at any point in time a unique set of clearing prices can be determined with the resultant price signals leading to an optimal allocation of resource.

In order to assess whether these rules ensure equality amongst all market participants it is necessary to look in more detail at the determinants of bid-ask spreads.

Part of a market-maker's cost structure will consist of general administrative expenses. These are likely to be more or less fixed per individual transaction and therefore will be recovered more quickly the higher the value of each individual transaction. Evidence that small deals are not attractive to jobbers can be observed from their unwillingness to take small odd-lots on to their books. They do this by offering only a one-way price to the brokers' inquiry.¹⁷ In practice then small deals are not welcomed by market makers and therefore there does exist a cost differential working against those wishing to trade in small amounts. Together with the benefits from a lower rate of broking commissions there is a clear cost advantage to trading in larger amounts. An intermediation service that pooled small transactions would indeed be providing an economic service. We note in passing that many investment management firms have their own in-house dealing companies where the transactions from the various funds under management can be cumulated before the order is passed onto the brokers. While the dealing company obtains the benefit of a

/ for a spread do not indicate whether they are acting for a buyer or seller.

17. This would appear to flout the rule regarding brokers' inquiries. However "another" rule ensures that "unusual" trading amounts or terms must be made known to the jobber.

lower commission rate it may well in practice be more problematical as to whether or not the full benefit is passed on to the funds. Unfortunately it may merely provide an expense "cushion" for the investment management company!

In addition to administrative expenses there are two other aspects of the market makers' cost function that may provide a justification for intermediation. The first concerns the operational costs involved in supplying a continuous liquidity service while the second involves the role of information. We deal with the former below and leave the latter to the following sub-section where we deal more fully with information costs.

Although the market making function involves jobbers at some stage having good title to the securities they provide a market in (in fact it is difficult to see how the jobbing function would operate without ownership transfer) they are perhaps best considered as traders rather than investors. However, the characteristics of the security commodity are the same irrespective of whether the holder is marketing liquidity or purchasing an investment. In view of this risk and return are relevant considerations for jobbers as is the risk reducing property of diversification. Interestingly while diversification is relevant the maintenance of a fully diversified book is not. Indeed the very concept of market making involves taking exposed positions in individual securities. However in the U.K. context as jobbing firms tend to offer market making services across a wide range of securities jobbing books may in practice be quite well diversified. We note in passing that even if the books were not well diversified

shareholders in the jobbing firms themselves could diversify away the risks associated with their company.¹⁸

At the individual security level jobbers will have preferred positions in each stock. If their books at any time don't reflect these preferred positions then they will both expect higher returns for the additional risk taken on and will make attempts to return to their preferred positions.

Jobbers can obtain compensation for the increased risk through charging more for their liquidity services. In other words by increasing spreads. Portfolio adjustments to return jobbers to their preferred holdings can be achieved through setting bid-ask prices (the central price) above or below those expected by the market thus inducing the necessary buy or sell orders.^{19, 20} The critical variable in this so-called inventory approach to explaining spreads is the amount of additional risk taken on by jobbers when they make a market in a particular security. For any given transaction this additional risk will be greater the smaller the resources of the jobber concerned.

18. Perhaps a reason for the wide cross section of securities covered by most jobbing firms is that their shareholders can't in fact provide the necessary personal diversification. If the shareholdings are not widely held and shareholder wealth is not limitless then there would indeed be case for the jobbing firms attempting to hold fully diversified books. Jobbing firms in the U.K. may well fall into this category.

19. Y. Amihad, H. Mendelson, "Dealership Market : Market-Making with Inventory", *Journal of Financial Economics*, Vol 8, No 1, March 1980, pps. 31-54.

20. Y. Amihad, H. Mendelson, "Asset Price Behaviour in a Dealership Market", *Financial Analysts Journal*, May/June, 1982, pps. 50-59.

(Both these articles provide excellent descriptions of the inventory approach to spreads.)

Given the market rules of the stock exchange it is extremely difficult to see precisely how an intermediation service could achieve, *ceteris paribus*, a narrower spread for any individual security. In addition a necessary pre-requisite to such a service would be knowledge of jobbers preferred position and their actual books. Jobbers we suggest would not be willing to impart this information!

There is no doubt that transaction costs and particularly those that relate to imposed or statutory pricing structures do provide an opportunity for the successful provision of intermediation services.²¹ However such operational conditions are transient and subject to change. Many of the intermediaries we observe in practice are long established companies and have therefore existed through successive and differing periods of regulation and control. Their operations can and do change to match the changing business environment. We tentatively suggest that the longevity and historical growth of many financial intermediaries may well be sourced from a more permanent *raison d'etre*. One such justification involves an area to which we now turn namely information and the need for information production.

- ii. Information Costs: The role played by information in markets in general and in financial markets in particular, including the need for information and the difficulties involved in information production is complex and has not by any means been fully explored at either the theoretical or empirical levels.^{22, 23} We start our development of

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21. G. Benston, C. Smith, "A Transaction Cost Approach to the Theory of Financial Intermediation", *Journal of Finance*, 31, No. 2, 1976, pps. 215-231.
22. J. Grossman, J. Stiglitz, "Information and Competitive Price Systems", *American Economic Review*, May 1976.
23. M. Rothschild, J. Stiglitz, "Equilibrium in Competitive Insurance Markets - An Essay on the Economics of Imperfect Information". *Quarterly Journal of Economics*, November, 1976.

of this topic and its usefulness as a source of intermediation services by considering the illustrative example of the importance of information suggested by Akerlof.²⁴

Observing the market for second hand cars Akerlof offers the following explanation for the well known difference in price between new cars in the showroom and ones that have just left.

Consider that there are four types of car in existence - new, used, good and bad. In purchasing either new or used cars the buyers take on the risks of acquiring either good cars or bad cars. Ownership for any length of time gives the proprietor an informational advantage as to whether the car is good or bad over any future buyer. A future buyer on the other hand with only the dubious advantage of the vendor's word as to the quality of the car would not be willing to offer the full price of a good car. In extremis the only price available would be that of a bad car. This price must obviously be less than the price of a new car or it would be possible to trade a 'lemon' at the higher new car price and then buy a new car! In Akerlof's rather extreme example the market fails because of information asymmetry between buyer and seller. However, given the observation that markets for second-hand cars actually exist then the striking price is more likely to reflect average expectations as to the quality of second-hand cars rather than the specific attributes of bad cars. This average price involves a redistribution of wealth in favour of the 'lemon' sellers. They will receive a price greater than the true value of their cars. The redistribution is at the expense of those with quality cars to sell who will receive the lower average price

24. G. Akerlof, 'The Market for Lemons; Quality, Uncertainty and the Market Mechanism', Quarterly Journal of Economics, Vol 39, August, 1970, pps. 488-500.

for their cars.

The presence of an asymmetrical distribution of information amongst market participants and the contractual difficulties it raises are, following Arrow, usually described in terms of the moral hazard problem.²⁵ Hoag and Draper note that the key characteristic of the moral hazard problem is, "the lack of observability of a variable upon which ... two parties would like to contract".²⁶ In Akerlof's example this variable was the quality of second-hand cars.

Unfortunately the effects of information asymmetry are not confined to the second-hand car market. Indeed in any market where "quality" is difficult to ascertain then there can be no guarantee that buyers and sellers will reach the same expectational conclusions. In these circumstances neither the buyers nor the sellers will know the accuracy of their own expectations, the accuracy of the other parties' expectations nor indeed the veracity underlying alternative expectations.²⁷

To the extent that information asymmetry results in the redistribution of wealth through incorrect pricing a reduction in its effects will be societally beneficial. In some markets this can be achieved relatively easily by the addition of guarantees or warranties to the original contract. However these instruments themselves are not free from consideration of quality.²⁸ A more general approach would be

25. K. Arrow, "Uncertainty and Medical Care", American Economic Review, No. 53, 1963.

26. D. Draper, J. Hoag, "Financial Intermediation and the Theory of Agency", Journal of Financial and Quantitative Economics, November 1978.

27. We are reminded of the differing expectations for project success that may exist between a bank manager and a (potential) borrower.

28. M. Jensen, W. Meckling, "Theory of the Firm - Managerial Behaviour, Agency Costs and Ownership Structure", Journal of Financial Economics, No. 3, 1976, pps. 305-360.

to attempt to reduce or remove the information asymmetries. We now turn to this problem within the specific context of the securities market.

The effects of information asymmetry in the context of the securities markets have been examined by Treynor (U.S.) and Hirst (U.K.)^{29, 30} Consider the jobbing role again. A jobber undertakes to provide a market for both buyers and sellers of a security. He does this by buying and selling the security on his own account irrespective of whether he has the securities to sell or the funds to commit. His book will square either through the transactions being reversed as trading continues or through the borrowing of funds or securities. As they trade on their own account jobbers are exposed to market fluctuations some of which they may find profitable and some not. Provided they feel that none of the market participants have any significant information advantages such exposure in itself would not present more than the usual difficulties associated with making investment decisions. However, in the situation where jobbers feel they are at an information disadvantage with at least some of the other market participants they may feel the investment game to be less than fair. To protect themselves against the possibility of trading with market participants possessing such superior information jobbers in much the same way as Akerlof's car market participants will alter their trading prices. In the case of jobbers ask prices will be raised and bid prices lowered. As it is not possible for jobbers to distinguish those participants who have superior information from

29. J. Treynor, "The Only Game in Town", Financial Analysts Journal, March 1971.

30. I. R. C. Hirst, "A Model of Market Making with Imperfect Information", Managerial and Decision Economics, February 1980.

"ordinary" participants the entire market suffers the pricing effect of information asymmetry. Thus the resulting market clearing set of prices involves both a redistribution of wealth in favour of the informationally superior and incorrect pricing signals for resource allocation.

The extent of these wider spreads will depend on the jobbers' assessments of the need to insure themselves against losses to well informed investors. In this context it is important to note that the potential cost to jobbers is a function not only of the specific item of asymmetrically distributed price-sensitive information but also of the length of time a particular investor could be expected to benefit from it. The more quickly private information becomes public the less will be the need for insurance and given competition amongst jobbers the narrower will be the spreads.

We now note that our information approach provides an alternative rationale for jobbers spreads. Rather than being based solely on the inventory approach described earlier jobbers spreads will now represent attempts to limit exposure to informationally superior investors while at the same time being sufficiently attractive to retain a competitive edge over rival jobbers. The identification of this alternative, although not mutually exclusive alternative, interpretation of spreads begs the question of relative importance. Unfortunately there are no reported results based on a direct comparison of the two approaches. What empirical work there is tends to concentrate on the inventory approach.^{31, 32, 33, 34 35} Whether

31. G. Benston, R. Hagerman, "Determinants of Bid-Ask Spreads in the Over-the-Counter Market", *Journal of Financial Economics*, 1, 1974, pps. 353-364.

32. /

this is through an assumed importance of holding costs or the data difficulties involved with the information approach it is difficult to tell. While there is a dearth of work in this area in general there are virtually no reported U.K. results.³⁶

To reduce information asymmetry and thus narrow spreads information about securities must be produced and disseminated. Unfortunately there are two considerations which make this a particularly difficult task. The first is the public good aspect of information. As information can be resold, passed on or merely given away without any value reduction to vendors or donors information producers will only receive a small proportion of the market's total valuation of the information produced. Thus it may not be commercially viable to produce the commodity information in the first place. The second consideration brings us back to the rectitude aspect of the moral hazard problem. How can good information be distinguished from bad information and following Akerlof given that bad information will tend to drive out good information what incentive will there be to produce good information. This problem has been succinctly described by Leland and Pyle.³⁷

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32. H. Demsetz, "The Cost of Transacting", Quarterly Journal of Economics, Vol. 82, No. 1, February 1968.
 33. H. Stoll, "The Pricing of Security Dealers Services", Journal of Finance, Vol. 33, No. 4, 1978.
 34. S. Tinic, "The Economics of Liquidity Services", Quarterly Journal of Economics, Vol. 86, February 1972, pps. 79-93.
 35. R. West, S. Tinic, "Competition and the Pricing of Dealer Services in the OTC Market", Journal of Financial and Quantitative Analysis, Vol. 7, June 1972.
 36. Consideration of confidentiality make it extremely difficult to obtain data, in particular transaction size and spread data, for the London Stock Exchange. See:
I. R. C. Hirst, K. Lyall, "Bid-Ask Spreads and Transaction Size - Some U.K. Evidence", Annual Conference of the E.F.A. - Jerusalem, 1982.
 37. H. Leland, D. Pyle, "Information Asymmetries, Financial Structure and Financial Intermediation", Journal of Finance, 32, No. 2, May 1977, pps. 371-387.

"... it may be difficult or impossible for potential users to distinguish good information from bad. If so, the price of information will reflect its average quality. And this can lead to market failure if entry is easy for firms offering poor quality information. Firms which expend considerable resources to collect good information will lose money because they will receive a value reflecting the low average quality. When they leave the market the average quality will further fall and equilibrium will be consistent only with poor quality information ..."

Any production of information must then satisfy both the appropriability and the moral hazard considerations. We suggest the following four methods by which information may be produced and disseminated.

- (a) Statute
- (b) Stockbrokers
- (c) Companies
- (d) Intermediaries.

- (a) Statute : The various Companies Acts require the disclosure of information considered relevant to investors and in particular to shareholders. In addition the Stock Exchange the various accountancy bodies press, without statutory backing, for further disclosure in areas where they consider the statutory requirements are incomplete. The statutory requirement of disclosure removes the problem of appropriability as the costs must be met by the companies. In addition the audit opinion goes some way towards ensuring the reliability of the information produced. Unfortunately the publication of such information while useful is very often long delayed and given the efficiency of the stock market will usually be superceded by information either disseminated voluntarily by companies or researched by other parties. We note in passing that information asymmetry may be reduced by the Statutory prevention of those with inside information on a company trading in

that company's securities. This approach has been followed by the authorities in both the U.K. and the U.S.

- (b) Stockbrokers : Hirst has suggested that in the U.K. context the minimum commission system which we described above may provide stockbrokers with a revenue shield behind which information could be produced and distributed to clients.³⁸ While this approach on its own would round the public good problem it would be insufficient to ensure either reliable research output or indeed that research was in fact being undertaken by a particular broker. Competition amongst brokers would help solve the former problem while regulations regarding the uses to which commission income could be put would help solve the latter.
- (c) Companies : Companies can of course produce information about themselves and market it either directly to the public or through the stockbroking distribution channel. Unfortunately even the best intentioned company is unlikely to disseminate "bad" news with the same candour as "good" news. Thus the moral hazard problem remains. A possible way round this has been suggested by Campbell and Kracaw who suggest that firms may pay outside parties to produce research information if it is felt that the results of such research efforts would lead to higher market valuations.³⁹ In much the same way as the audit opinion is independent of management and owners outside "expert certificates" would also possess the mark of independence and objectivity. We note in passing that firms may employ outside consultants to revalue assets and that it is not uncommon for firms to pay for the relevant research output of stockbrokers.

38. I. R. C. Hirst, "The Case for Minimum Commissions", Investment Analyst, January, 1982.

39. T. Campbell, W. Kracaw, "Information Production, Market Signalling and the Theory of Financial Intermediation", Journal of Finance, 35, No. 4, September 1980, pps. 863-882.

In deriving their approach to information production the arguments of Campbell and Kracaw while providing a solution to the appropriability problem lead to a conclusion that the reliability of information produced will be positively related to the size of the stake the information producers have in the information producing company. They note that the size of this stake may act as a barrier to the entry of smaller and perhaps more efficient information producers.

- (d) Intermediaries : Leland and Pyle have suggested that the presence of both the moral hazard and appropriability problems provide a rationale for financial intermediation.⁴⁰ They argue that if information production is undertaken by an intermediary then costs and returns of information production will be internalised and management success or otherwise will be evident from the returns on the intermediary's portfolio. The moral hazard problem would be solved they suggest by the information producers within the intermediary holding equity in the intermediary. As in the Campbell and Kracaw case this would act as a signal to the rest of the financial community of the reliance to be put on the information producing function.

In addition to their comments on intermediation : Leland and Pyle also derive a negative relationship between specific risk and optimum debt levels based not on the presence of bankruptcy costs but on the signalling solution to the moral hazard problem. They note that as the portfolios of most intermediaries are

40. H. Leland, D. Pyle, "Information Asymmetries, Financial Structure and Financial Intermediation", *Journal of Finance*, Vol. 32, No. 2, May 1977, pps. 371-387.

dominated by securities with low specific risks their analysis provides not only a justification for financial intermediation but also an explanation for a characteristic of many intermediaries namely high gearing.

There are however two points that should be noted with regard to the rationale for intermediation suggested by Leland and Pyle. Firstly, as the authors themselves note, the benefit received by an information producing financial intermediary will be reduced to the extent that outsiders can gain the same information merely by examining its portfolio. Secondly as Campbell and Kracaw have suggested there is an element of illogicality in the way Leland and Pyle solve the moral hazard problem. In particular if it is possible to signal reliability through ownership stakes then there is no reason why such signalling should not be undertaken by management investing in the firms they manage. If this were possible the need for intermediaries in the Leland and Pyle sense is obviated.

As well as offering the above criticism Campbell and Kracaw go on to posit the following intriguing rationale for intermediation :

"The answer (... to the intermediation problem ...) would seem to be that intermediaries can profitably emerge where they can jointly produce information as well as other products or services valued by investors".

Unfortunately they also note that :

"A complete model of the joint production approach to intermediation awaits a separate treatment".

The Leland and Pyle approach to information production certainly provides an intuitively attractive justification for the observed presence of financial intermediaries although the doubt cast on their solution to the moral hazard problem is a drawback. While we have no formal theoretical framework which will allow the joint product suggestion of Campbell and Kracaw to be examined it too has intuitive appeal. In particular our earlier discussion on transaction costs could provide elements of the joint product as too could some of the observed investor services offered by intermediaries such as insurance contracts, taxation advice, book-keeping services, etc.

With our review of the rationale underlying financial intermediation now complete we turn to the more specific question of the intermediation services being provided by ITCs.

2. Investment Trust Company Intermediation Services: In this section our objective is three fold. First of all we look briefly at the historical experience of the ITC sector. Secondly we look in slightly more detail at the characteristics of the movement during the period we are primarily interested in namely the 1970s. Finally we summarise the main aspect of the intermediation services provided by ITCs.

- i. The Development of the ITC Sector: It is not our intention to provide a detailed history of the ITC movement. This has been done more than adequately elsewhere. See for example, ^{41,42,43,44,45,46,47}. In addition to these references many of the older

41. The Economist, "Investment Trust Supplement", December, 1934.

42. H. Burton, D. C. Corner, "Investment and Unit Trusts in Britain and America", Elek Books, London, 1968.

43. A. Arnaud, "Investment Trusts Explained", Cambridge, 1977, p.4.

ITCs have produced their own firm histories. (See Chapter 1, Appendix 1). Rather our objective is merely to provide an overview of the sector's development in order to help identify the services being provided by ITCs. Our sources for this are the references noted above.

Arnaud has suggested that the growth of the ITC movement has been characterised by :

"... periods of intense activity followed by a financial crisis and then by a long period of indigestion until the next upturn".⁴⁸

While such comments would serve to describe economic progress in general they certainly highlight the changing perceptions of using the ITC intermediation vehicle.

The first ITC is generally agreed to be the Foreign and Colonial Investment Trust set up in 1868 to invest in overseas government stocks. Arnaud describes the characteristics of the Foreign and Colonial as follows :

"The Foreign and Colonial was formed to invest in a selection of eighteen overseas government securities at an average yield of 8%. Participants were issued £100 certificates, bearing interest at 6%, at a price of 85 to yield 7% at that price. A sinking fund derived from surplus income and the capital surplus on the portfolio securities was to be used to redeem the certificates at par."⁴⁹

44. T. Jackson, "The Enterprising Scot", Edinburgh, 1968.

45. H. Bullock, "The Story of Investment Companies", Columbia, 1959.

46. W. G. Kerr, "Scottish Capital on the American Credit Frontier", Texas State Historical Association, Austin, Texas.

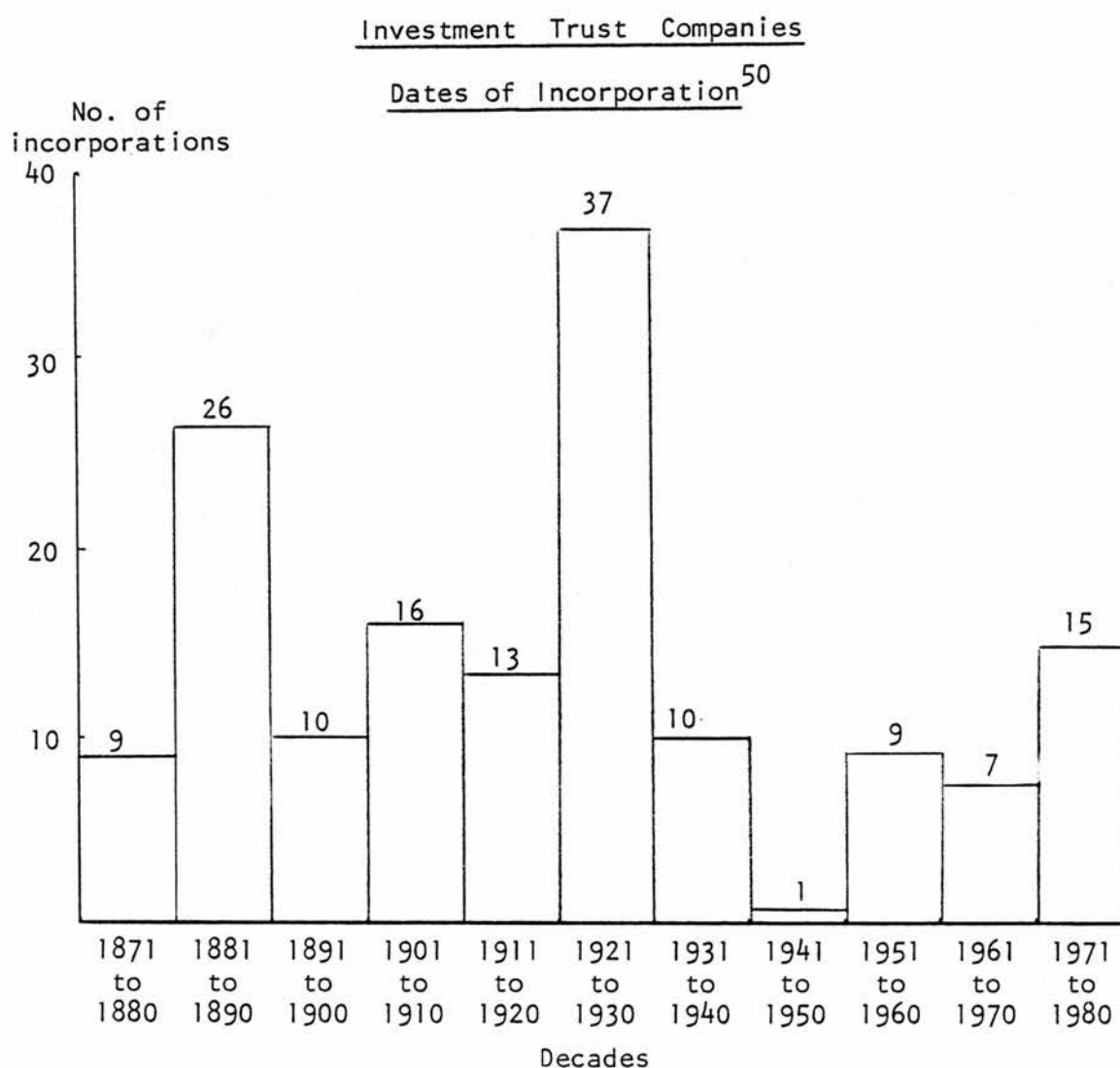
47. G. Glasgow, "Guide to Investment Trust Companies", Glasgow, 1935.

48. A. Arnaud, "Investment Trusts Explained", Cambridge, 1977, p.4.

49. A. Arnaud, "Investment Trusts Explained", Cambridge, 1977, p.3.

Initially the company was intended to have a life of 24 years. However in 1879 the outstanding certificates were exchanged for equity. Since then the Foreign and Colonial has grown to control by the end of 1980 assets in excess of £250m. Some idea of the popularity and otherwise of the ITC intermediation vehicle since the sector's beginnings in the late 19th century can be gained from Diagram 1(i).

DIAGRAM 1(i)



50. Data sourced from (i) Association of Investment Trusts, 1980 Handbook and (ii) Extel Company Information Cards. The 153 ITCs covered represent about 50% of the sector's numerical size but account for over 95% of the assets under management.

From the above Diagram there are clearly four periods of relative popularity - 1871 to 1890, 1901 to 1910, 1921 to 1930 and 1971 to 1980. The decade of the 1940s on the other hand stands out as one of relative unpopularity. It would be unwise to read too much into dates of incorporation but several general points can be made. The initial impetus to the movement came partly from the Companies Act 1862 which provided the basis for the limitation of shareholder liability and partly from the opportunities especially international opportunities that the imperfect capital markets of the time offered. Following the Baring Crisis which had a real and pervasive effect on all aspects of investment the period up to World War I was one of continued expansion for ITCs especially in the Empire. The War dramatically curtailed foreign investment as the Government insisted on foreign holdings being exchanged for domestic gilts in order that war loans could be secured and foreign debts repaid. The nineteen twenties was a period of recovery from the War years, re-establishment of foreign portfolios and some growth especially in the new consumer based industries. The ITC sector shared in at least some of the success of this period and by the late 1920s there had been a significant shift in portfolio structures to industrial investment and indeed there is also some evidence of an increased exposure to the equity as distinct from the fixed interest market. Compared to U.S. closed-end mutual funds the ITC sector survived the depression of 1930s in remarkably good shape. This was in part at least due to most U.K. ITCs having avoided the "debt pyramiding" practices so prevalent amongst U.S. firms in the 1920s.

In many respects the end of the 1930s represents an important turning point in the development of the movement. It is therefore useful at this stage to summarise certain of the sector's characteristics. The poor availability of relevant data unfortunately precludes any detailed survey. However, the task is made slightly easier by the existence of an extensive survey of ITCs carried out by the Economist in 1934. We show certain results of this survey in Tables 1(iii) to Table 1(v).⁵¹

TABLE 1 (iii)

<u>Investment Trust Companies</u> <u>Industrial Distribution of Portfolios</u> <u>1933</u>	
(29 Companies)	
Classification	%
Government & Municipal	12
Railways	15
Utilities	12
Other Industrial	61

51. The Economist, "Investment Trust Supplement", December, 1934.

TABLE 1 (iv)

<u>Investment Trust Companies</u> <u>Security Distribution of Company Holdings</u> <u>1933</u> (46 companies)	
Security	%
Debentures	39
Preference Shares	27
Ordinary Equity	34

TABLE 1 (v)

<u>Investment Trust Companies</u> <u>Geographical Distribution of Portfolios</u> <u>1933</u> (41 companies)	
Country	%
U.K.	48
U.S.	12
Empire	11
Rest of World;	
South & Central America	12
Europe	12
Other	5

The experiences of the 1st World War with regard to foreign investment holdings were repeated for the 2nd World War. Indeed not only the war years but the post-war period up until 1979 were years when foreign portfolio investment was strictly controlled. The period to the mid-1960s however was one of very substantial growth for Western economies. The re-generation of old industries, the development of new industries together with the presence of low interest rates provided ITCs with a period of significant growth and development. Interestingly there was no substantial rise in the number of ITCs in existence growth and success being largely confined to the long established ITCs. The portfolios of these ITCs did however undergo a considerable metamorphosis during this period. Table 1(vi) to Table 1(viii) summarise various aspects of the sector in 1965.⁵²

TABLE 1 (vi)

<u>Investment Trust Companies</u> <u>Industrial Distribution of Portfolios</u> <u>1965</u> (Entire Sector)	
Classification	%
Government Stocks	2
Local Authority Stocks	1
Company Securities	97

52. Data sourced from :

H. Burton, D. C. Corner, "Investment and Unit Trusts in Britain and America," Elek Books, London, 1968, Chapters 6 and 7.

TABLE 1 (vii)

<u>Investment Trust Companies</u> <u>Security Distribution of Company Holdings</u> <u>1965</u> (Entire Sector)	
Security	%
Debentures	1
Preference Shares	3
Ordinary Equity	96

TABLE 1 (viii)

<u>Investment Trust Companies</u> <u>Geographical Distribution of Portfolios</u> <u>1965</u> (Entire Sector)	
Country	%
U.K.	65
U.S.	29
Rest of the World	6

Although for reasons of consistency great care must be taken in comparing the Tables for 1965 with those noted earlier for 1933 the differences

are sharp. In particular by 1965 portfolios were dominated by corporate equities whereas the earlier portfolios were primarily characterised by fixed interest debt and gilts. In addition there is evidence of increased concentration in the U.S. and the U.K. at the expense of the rest of the world.

These changes in portfolio composition and in particular the switch to corporate equities represent a fundamental change in ITC portfolio strategy. The two most important reasons underlying this change are the attractiveness of the equity market during this period plus the increased internationalisation of domestic capital markets which substantially reduced the possibility of exploiting the historical *raison d'être* of ITCs namely interest arbitrage opportunities.

The fifteen years to 1980 have been amongst the most difficult faced by the ITC movement. Rigorous exchange controls including the premium surrender, new capital, corporate and personal tax regimes which have reduced the attractiveness of the ITC vehicle and perhaps also a greater competitiveness for investor funds from other intermediaries have led to much heart-searching as to what role ITC should play in current financial markets. Only towards the end of the decade did answers to these questions arise. We return to this area in Chapter 7. The surge of new ITCs in the early part of the 1970s was something of a false dawn. Many were formed to exploit perceived opportunities arising from the U.K.'s entry into the E.E.C. Several of these early 1970's ITCs have now either been wound-up or amalgamated.

(ii) ITC Characteristics - 1971 to 1980 : We now move on to examine the characteristics of ITCs during the ten years to 1980 in slightly more detail. We do this in terms of

- (a) Sector Size
- (b) Ownership Patterns
- (c) Delegated Management.

(a) Sector Size : The equity capitalisation of the sector is shown in Table 1(ix).

TABLE 1(ix)

<u>Investment Trust Companies</u> <u>Size - Equity Capitalisation</u> <u>1971 - 1980 (December 31)</u>										
										£m %
Description	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Equity Capitalisation	4245	4931	4091	1486	3402	3171	4162	4028	3765	7588
FTA : ITCs as % of Total FTA Equity Groupings										
<u>No. of ITCs</u>										
50	6.3	5.9	5.5	6.5	5.8	5.3	4.7	4.3		
109								6.1	5.4	6.2

Notes: 1. Sources (i) Stock Exchange⁵³
(ii) Faculty of Actuaries⁵⁴

53. Stock Exchange Fact Book - various issued 1971-1980.

54. Faculty of Actuaries (Data made available by J.R.C.H. Brumwell).

This Table indicates that the sector is significant both in relative and absolute terms. The average capitalisation of the ten observations is £4086m with a high in 1980 and a low in 1974. Some care must be taken with the comparability of these annual statistics. Changes and reclassifications among constituent members make both the Stock Exchange and the FTA groupings difficult to deal with on a time series basis. However even allowing for this 1980 together with 1972 and 1974 do represent major points of interest.

In 1972 the sector expanded by some £450m partly through rights issues from existing companies and partly through the formation of new ITCs. This was a substantial increase in the sector size and reflected a combination of factors including the rather bullish expectations of many investors as to the ability of equities in general to act as a hedge against inflation. In addition as we noted above many of the new ITCs were found to exploit opportunities arising from E.E.C. membership. 1974 and in particular December 1974 was the low point of the financial crash which followed on from the secondary banking crisis. On December 13th (Friday) the FTA-All Share Index bottomed out at 61.92 some 40% of its January 1974 level and some 26% of its mid-1972 level. That the ITC sector retained its relative size in the equity sector during this period does not hide the fact that many individual ITCs especially the smaller ones were faced with a significant reduction in the size of their portfolios.

The 1979-1980 period witnessed a dramatic change in the fortunes of the sector. An indication of the extent of this change is described in Table 1(x).

TABLE 1(x)

<u>Changes in the FTA All Share and</u> <u>Investment Trust Indices</u> <u>During 1979 and 1980.</u>			%
Index	1979	1980	
FTA - All Share	4.35	27.07	
FTA - Investment Trust	-5.08	46.44	

Notes : 1. Source : Faculty of Actuaries⁵⁵

Commentators have suggested many reasons for the growth in the sector during the last year or so of the decade. These include the abolishing of capital gains tax on ITC portfolio transactions and the complete removal of exchange controls in 1979. However while capital gains tax may have been a restriction on the freedom of ITC managers a credit system had been devised to virtually exempt tax paying shareholders from any elements of double taxation when they realised their ITC shares. Non-tax paying shareholders such as pension funds had no access to the credit. Similarly while ITCs had over the years built-up a considerable expertise in foreign investment which involved the additional decision parameters of currency and premium expectations it is not clear that investors consider the attractions of ITC intermediation vehicles purely in terms of the general institutional framework within which ITC managers operate. Managerial skill at achieving success within a given framework

55. J.R.C.H. Brumwell, "Notes on the FTA Indices", Transactions of the Faculty of Actuaries, 1979, 1980.

would perhaps be more important. In the context of foreign investment we note later that there appears to be no obvious relationship between the discount and the premium. To the extent that the mere existence of the premium market and the surrender rule were important to the relative attractiveness of ITCs a positive relationship could have been expected.

We suggest that changes in the relative size of the sector may reflect not so much changes in the institutional environment but the relative attractiveness of particular intermediation services being offered by management at particular times. It is interesting to note that the relative size of the sector in the crash of 1974 was higher than in the previous year. The ability of managers to re-balance their portfolios defensively may have offered investors a slightly more attractive alternative than they could have achieved themselves. Similarly in the stock market rise of 1979-1980 additional exposure to particular sectors, securities or indeed gearing could have been gained by adding a suitable ITC investment to a direct investment holding. If the particular sector or security was in great demand this may well have been the only way to gain a desired level of exposure. We return later to look more closely at these market timing aspects of intermediation together with the relevance of the discount mentioned above.

Although 1972, 1974 and 1980 are the obvious points of interest the slight decline in the sector's size between 1975 and 1976 is worthy of note. The period saw several major take-overs of ITCs by particular pension funds. In total some £300m in terms of equity capitalisation was removed from the sector. This period is generally

considered as one of great difficulty for the sector.

In addition to equity capitalisation a further size perspective is to consider the underlying portfolios of ITCs. Table 1(xi) compares the assets managed by ITCs with those managed by unit trusts a broadly comparable financial intermediary.

TABLE 1(xi)

Investment Trust Companies and Unit Trusts										
Gross Assets Managed										
1971 - 1980 (December 31)										
										£m
Description	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
ITCs - Assets	5759	7515	5598	2729	5650	6066	6564	6676	5995	7458
Unit Trusts - Assets	1953	2553	2097	1405	2555	2622	3432	3873	3937	4968

Notes : 1. Source : Financial Statistics⁵⁶

It is clear that the ITC sector is considerably larger than the unit trust sector. This size differential is further reflected in the average size of the individual ITCs and unit trusts. At December 31, 1980 the average size of an individual unit trust (£37m) was more than double that

56. Financial Statistics (CS0), various issues 1971-1980.

of an individual unit trust (£15m). However both sectors pale considerably when compared to pension funds and insurance companies. At the end of 1980 the assets managed by these two sectors totalled £20,000m and £47,000m respectively.

- (b) Ownership Patterns : We noted earlier in this chapter the increasing institutionalisation of the stock exchange due primarily to the post 1965 tax regime. The ownership patterns of ITCs show a similar concentrating of equity in the hands of the institutions at the expense of individual investors. Tables 1(xii) and 1(xiii) provide the details.

In addition to the problems associated with the classification of nominee holdings discussed above a further data weakness in Table 1(xii) arises from the use of different sample sizes. Unfortunately there is a considerable range of sample sizes in the data presented in this Table. For example the 1976 and 1980 figures cover 23 and 36 ITCs respectively while the 1971, 1974 and 1977 figures cover approximately 80% of the AITC membership.

A comparison between Table 1(xii) dealing with the market as a whole and Table 1(i) suggests that the move to institutional ownership has been greater in the case of ITCs and especially so in the years towards the end of the decade it is noticeable that the institutional stake has tended to be proportionately greater for the market as a whole than for the ITC sector. This would certainly accord with the views of many ITC managers that individuals are the ownership group that ITCs are best suited to serve. However the 1980 ITC figures suggest that this position may be in the process of change. We re-emphasise however

TABLE 1(xii)

<u>Ownership of ITC Equity</u> <u>Selected Years 1971 - 1980</u> (%)					
Ownership Group	1971	1974	1976	1977	1980
Individuals	46	40	42	40	28
Banks & Nominees	24	24	20	24	18
Sub-Total	70	64	62	64	46
Insurance Companies	14	18	19	N/A	27
Pension Funds	2	2	4	↓	8
Investment Companies	7	7	6	↓	8
Other	7	9	9	↓	11
Sub-Total	30	36	38	36	54
	100	100	100	100	100

Notes : Sources - 1. Years 1971, 1974 ⁵⁷
 2. Years 1976, 1980 ⁵⁸
 3. 1977 ⁵⁹

57. Royal Commission on the Distribution of Income and Wealth; Supplementary Evidence submitted by the Association of ITCs 1975, pp. 5-6.

58. Annual accounts of 23 ITCs for 1976 and 36 for 1980.

59. Wilson Committee, Evidence submitted by the Association of ITCs and published separately, page 13 (1978).

the need for great care with ownership statistics and suggest more evidence is required to fully support the 1980 figures.

Within the ITC sector there is a considerable variation of ownership characteristics. Table 1(xiii) details some of these differences for 36 ITCs in 1980/81.

Given the limitations on the data and the relatively small and perhaps unrepresentative sample it is difficult to be more than tentative about any underlying relationships. However, a relationship is suggested between ITC size and institutional holding.

The large purchasing capacity of many institutions combined with the substantial trading economies that can be obtained from dealing in large blocks of stock suggest that institutional investors would find it easier to trade in the larger and perhaps more marketable ITCs.

Graph 1(i) plots institutional holdings against ITC market capitalisation.

Contrary to the result we anticipated there is pronounced negative relationship between size and institutional holding. Indeed the correlation coefficient on the data was reported as -0.4547. It would appear then that the hypothesised marketability advantage of investing in the larger ITCs was either incorrect or was less important than expected.

TABLE 1(xiii)

Ownership of Selected ITCs					
1980 - 1981					
(%)					
Trust	Individual & Nominee	Institutional & Other	Trust	Individual & Nominee	Institutional & Other
Alliance Investment	33	67	Trustees	49	51
Atlas Electric & General	58	42	Investors' Capital	39	61
Continental Union	44	56	RIT	59	41
Guardian	53	47	Witan	58	42
Murray-Caledonian	55	45	UBS	53	47
" -Clydesdale	42	58	Mercantile	27	73
" -Northern	39	61	Aberdeen Trust	60	40
" -Western	59	41	Scottish Mortgage	63	37
Scottish Northern	75	25	Monks	61	39
Sphere	40	60	London Trust	48	52
Bankers	48	52	Drayton-Premier	23	77
British Assets	51	49	" -Commercial	16	84
Cedar	38	62	" -Consolidated	32	68
CLRP	24	76	English & International	35	65
General Investors	39	61	Scottish Eastern	60	40
Industry & General	67	33	Securities Trust	28	72
International	35	65	St. Andrew	76	24
Scottish United	60	40	Edinburgh Investment	68	32

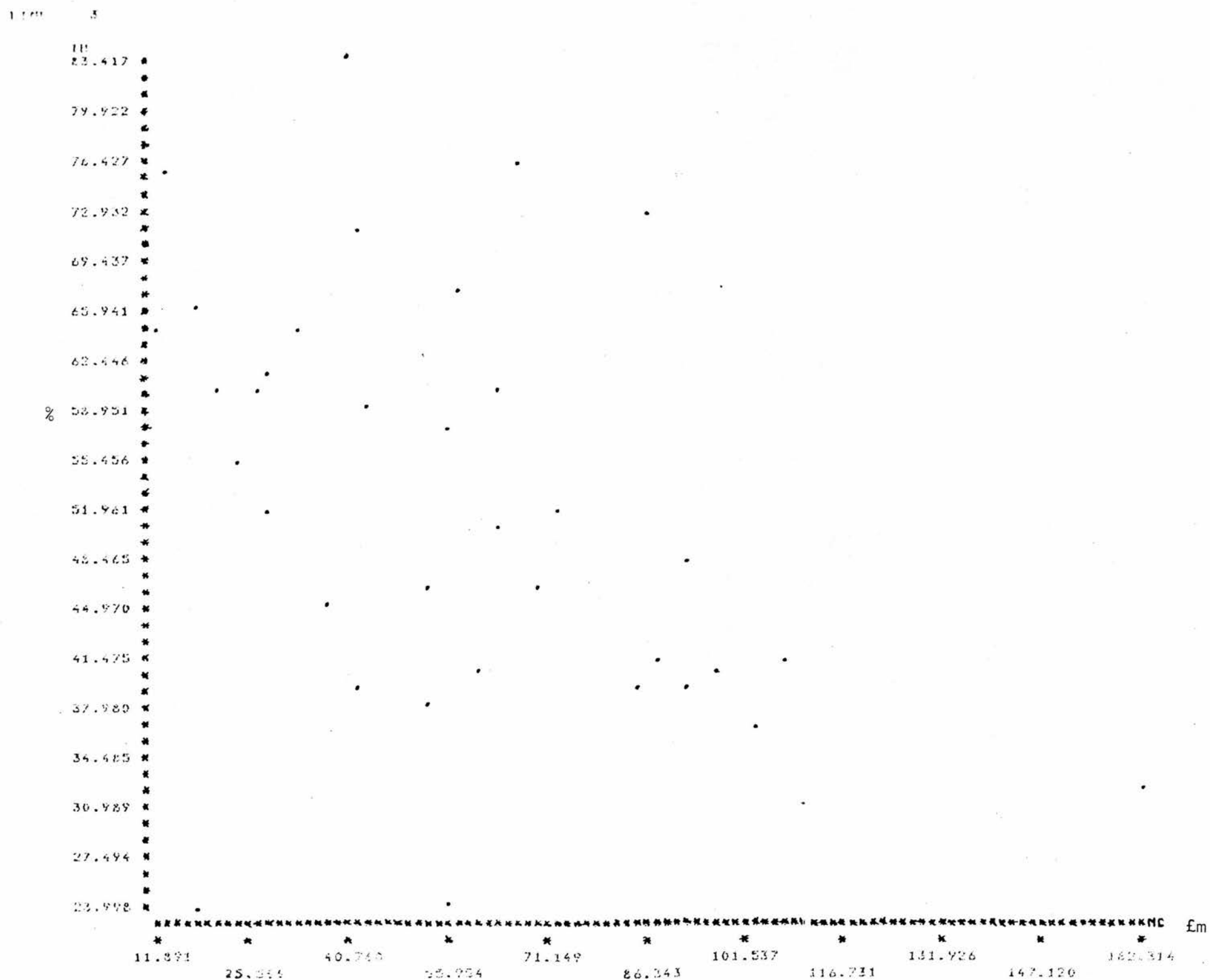
Notes : 1. Source : Annual accounts 1980/81.

2. The companies included represent virtually all the ITCs that published ownership details in 1980/81. Insufficient data was available to make meaningful comparisons with previous years.

GRAPH 1(i)

Investment Trust Companies

Institutional Holdings (IH-vertical) and ITC Market Capitalisation (MC-horizontal)



Notes: 1. The companies included are those detailed in Table 1(vi).

The data does suggest however, that the middle sized ITCs are the ones attracting the most institutional attention. Given the pressure that many of these ITCs face to unitise or liquidate it is certainly plausible that some of the institutional stakes represent tactical positions taken in expectation of the capital profit that would follow an ITC liquidation or unitisation at underlying net asset values. As many ITCs can be purchased at substantial discounts the possibility and extent of such gains may well appeal to some institutional investors.

- (c) Delegated Management : As we noted in Section 1 financial intermediation involves the repackaging of financial claims. Successful repackaging involves both portfolio selection and the choice of rights that attach to ITCs' own equity. In practice considerably more time and attention is given to the portfolio aspects of the process than to the characteristics or appeal of the repackaged claims.

The decision to delegate investment decisions to the management function of an ITC turns very much on the investors' perception of the performance being achieved by the ITC management. Therefore it is crucially important that investors are able first of all to identify the management function and secondly that they have sufficient information to assess the strengths and weaknesses of particular managements and their strategies. Unfortunately the increasing concentration of ITC management into management groups which we noted in Section 1 has mitigated against the accurate identification of management functions. On the other hand there

is now increasing use of "statements of objectives" for particular ITCs which may allow investors the opportunity to assess particular management strategies.

The publication of management objectives was given a major boost in 1978 following the first edition of the Association of Investment Trust Companies Handbook in which member ITCs were required to specifically state their objectives.

Given a repackaging function for the intermediation vehicle there is a considerable number of available strategies for management to follow. Some will highlight the portfolio aspects of their work indicating for example an intention to maintain a significant proportion of the assets abroad. Others may prefer to emphasise the quantitative aspects of their repackaging efforts in terms of the income or capital growth their investors could expect.

At first pass statements of objectives would appear to give an extremely useful method of identifying and assessing management functions. However on closer examination it is clear that in practice many managements are only committing themselves to the very broadest of objectives. Some examples of statements are as follows :

1. "Designed to achieve a diversified portfolio of investments with good prospects of income and capital growth."
2. "Growth of income and capital."
3. "To obtain capital and income growth through a portfolio

with a broad geographical base."

4. "The company's business is that of an orthodox investment trust with an international spread of investments and with a degree of capital gearing. The objective is to provide members with long term capital appreciation and a steadily increasing return."
5. "Capital growth with steady increase in dividends"
6. "To utilise the resources of the trust by active and flexible management, including geographical shifts of emphasis, aimed at progressive annual distributions supported by a growth of asset value performance."
7. "This trust aims for growth both in capital and dividends through an increasingly international portfolio of high quality equities."
8. "To invest mainly in the shares of smaller companies."
9. "Growth of capital for high tax paying individuals."
10. "To invest primarily in securities of companies carrying on business in Japan with a view to growth."⁶⁰

60. Association of Investment Trust Companies Handbook, 1978.

The last three statements are particularly interesting in that they are considerably more specific indicating either a reasonably precise investment objective - Japan or smaller companies - or the particular investor category that the management are attempting to service - high tax payers. Unfortunately in many cases the statement of objectives provides little more than a minimum indication of the strategy management intends following.

There is then a very real difficulty in identifying both management functions and the repackaging services they are offering to investors. Comments such as "poor marketability" and "homogeneity" that are often used to describe the ITC sector are at least partly due to these problems of identification.

While there may be difficulties in determining what ITC managements intend to do it is slightly easier to detail the services they have been providing. We do this in four sections :

- (i) Ownership Instruments
- (ii) Gearing Characteristics
- (iii) Investment Strategies
- (iv) Managment Intermediation Costs.

(i) Ownership Instruments : Ordinary equity represents the largest source of funding for ITCs. We noted above that 1972 and to a lesser extent 1980 represented the principle years of expansion in the equity base of the sector. However while the changing appeal of ITCs as intermediation vehicles will usually lead to periods of contraction and expansion the underlying capital base of ITCs can best be considered as fixed in all but the long-term. This contrasts

with the open-ended characteristic of unit trusts. Company Law effectively prevents regular capital reductions and the discount to net asset value at which most ITC equities stand considerably limits the possibility of raising new amounts on the stock market.

The characteristics of the equity claims offered by ITCs are in essence no different from those offered by industrial and commercial companies. The risks of ownership involvement are taken on by investors in return for an uncertain dividend stream and the possibility of a capital gain or loss.

Traditionally the dividend component of the total return attached to ITC equities has assumed a greater importance than the capital component. As we suggested earlier the historical roots of this can be traced back to the initial *raison d'être* of many ITCs namely to exploit interest arbitrage opportunities between borrowing in the U.K. and investing abroad in foreign utilities and mortgages.⁶¹ The importance attached to repackaging investment portfolios into high dividend streams for ITC equity holders has today become enshrined in many of the regulations surrounding the operations of ITCs.

However with the increasing internationalisation of financial markets the opportunities available for such arbitrage operations have been reduced considerably and consequently ITC portfolios have become equity orientated. Given the need to incur expenses in the intermediation process it is no surprise to note that the dividend yields obtainable from ITCs working with equity portfolios have consistently been lower than that obtainable in the market generally.

61. H. Burton, D.C. Corner, *Investment Trust and Unit Trusts in Britain and America*, Elek Books, London (1968), chapters 1-4.



During the nineteen fifties and early sixties ITC equity holders found no particular difficulty in accepting this new role for their intermediation vehicles. They could satisfy their income requirements through holding ITC debt or preference equity and also make substantial capital gains as ITC managements took advantage of the gearing aspects of these instruments in the low interest and generally bullish markets of the period.

Unfortunately the tax changes of the mid-nineteen sixties and in particular the introduction of capital gains tax reduced the attraction of ITCs as a vehicle for capital appreciation. At roughly the same time and also for tax reasons it became more efficient for savings to be channelled into equities through either net or gross funds. Indeed this period saw the first major shift to the institutionalisation of the stock exchange described in section 1. A characteristic of pension and insurance funds is that their liabilities must usually be met in annuity form. It is then important for such funds to ensure that their portfolios generate sufficient income to meet regular and large cash outflows. While the major portion of these liabilities will be met from gilt-edged investments an involvement in equities provides both diversification and indeed necessary outlet for funds given the sheer size of institutional cash inflows. These cash inflows consistently make institutions net purchasers of securities. Therefore the need to cover liabilities plus the effect of being net purchasers tend to orientate institutional equities investment policies towards returns with a significant dividend weighting. Although to the extent that funds are willing to meet current liabilities out of current contributions this effort would be reduced. As a

large sector of the stock exchange ITCs found themselves under pressure from this new breed of investor to gear their repackaging efforts to the production of high dividend streams. With capital gains tax effectively undermining an "asset growth" defence to this pressure and perhaps with memories of the traditional ITC role the sector acquiesced to this change of direction. However as we noted above intermediation expenses and reduced arbitrage opportunities made this a hazardous path indeed. The fact that ITC dividend yields in spite of the discount have been consistently and significantly lower than those on the rest of the market for the major part of the decade is a partial indication both of the sector's lack of success in meeting the requirements of the new institutional owners and indeed of the difficulties involved in achieving them. Dividend yields have also been influenced by exposure to non-U.K. markets in particular the U.S. where the dividend component of total return tends to be lower than in the U.K. This lack of success was undoubtedly a factor in prompting the rush of take-overs in the post 1975 period although as we noted earlier the possibility of gaining access to an underlying ITC portfolio at a discount would also be a relevant consideration on the part of any aggressor.

Towards the end of the decade, perhaps as a result of the abolition of capital gains tax and exchange controls creating an easier operating environment but perhaps also as a result of the take-over pressure of the previous years leading to a greater awareness of the need to carefully define the intermediation product being offered the sector began to investigate alternative services to those dominated by yield

and dividend considerations. Indeed since 1979 there has been an increase in the number of ITCs that offer foreign exposure or a specialisation in growth situations. It may well be that during the nineteen eighties the sector can persuade institutional investors of the merits of this change in direction. Certainly in view of the nature of the institutional liabilities noted above it is at least arguable that these new developments represent investment strategies not readily available to the institutions.

The equity product being supplied by the ITC sector is then undergoing a change of emphasis. It is however too early to judge success or failure.

The sector has in addition to ordinary equity several other forms of ownership interest outstanding. The various instruments are summarised in Table 1(xiv).

It is clear from Table (xiv) that ordinary equity is by far the most important ownership instrument. Preference equity which traditionally provided a limited ownership interest in return for a constant and "preferred" income is something of an anachronism given that debt can provide a similar income with the advantage that service charges are tax deductible. Convertible debt by offering a guaranteed income combined with the option of conversion to ordinary equity has provided a reasonably attractive alternative to both share issues at substantial discounts and direct borrowing at high nominal rates. While the value importance of the other two instruments is negligible "B" shares in particular are interesting.

TABLE 1(xiv)

<u>Investment Trust Companies</u> <u>Ownership Instruments Outstanding</u> <u>December 1980</u> (70 Largest ITCs)		
Ownership Instruments	No.of Companies	% of Total Value
Ordinary Equity	70	95
Preference Equity	61	3
Convertible Debt	23	1
"B" Shares	23	
Warrants	1	1

Notes : 1. Source : (i) Annual Accounts
(ii) L. Messell & Co.⁶²
(iii) Laing & Cruickshank⁶³

2. The percentage of total value is based on full conversion and taken at market value.

Their introduction represented an attempt to provide an intermediation product specifically geared to high tax payers. In distinguishing between investors in different tax brackets "B" shares are similar in this respect to the capital shares available from split level trusts.

62. L. Messell & Co., Investment Trust Companies 1980.

63. Laing & Cruickshank, Investment Trust Handbook 1980.

Although we deal with the tax status of "B" shares in chapter 2 we note in passing that as these advantages were eliminated in 1975 they too represent an anachronism.⁶⁴

(ii) Gearing Characteristics : The sensitising of an equity involvement in an ITC by allowing management to borrow has traditionally been one of the most publicised advantages of the ITC intermediation service. Although the precise effect of borrowing will vary depending on the characteristics of the debt instrument introduced there are several general points which should be noted.

Borrowing allows managers to obtain higher returns for a given equity stake under two circumstances. First of all they must correctly anticipate a bull position for their investment portfolios. Secondly the results of their investment decisions must cover the cost of borrowing. As debt servicing costs are tax allowable and contain no elements of profit sharing the income benefits from gearing can be considerable. However what are benefits under bull conditions tend to be disadvantages in bear markets. If investment returns are reduced then the fixed nature of prior charges may well become a real burden to the equity interest. While the suggested advantages of gearing are to a large extent determined by managements' ability to make correct investment assessments the ability to raise substantial borrowings is certainly a facility that many individuals and institutions do not have access to.

At this stage it should be noted that there is a substantial literature in finance centred on analysing the effects of gearing on company

64. Finance Act (No. 2), 1975, H.M.S.O.

valuations. If gearing effects the market value of a firm the possibility of an optimum gearing level exists. On the other hand if valuation is determined purely by the economic value of the underlying assets and not by the methods of financing them then company valuations will be insensitive to any substitution of debt for equity. This latter position is of course the one initially proposed by Modigliani and Miller.⁶⁵ While their first pass at the area has been modified considerably over the years and in particular with regard to taxation and the observable existence of investor groups with differing marginal tax rates the essence of their initial article at least at the individual company level is still persuasive.⁶⁶ A direct implication of the Modigliani and Miller proposition is that while the overall valuation of the company will not change as the equity proportion is reduced the expected return on this equity will rise to compensate shareholders for the fact that the unchanged business risk of the company is now concentrated on a smaller equity investment. The relationship between the expected return to shareholders and changes in risk arising from changes in gearing levels has been investigated by Hamada.⁶⁷ His results indicate that the trade-off is positive as predicted by Miller and indeed that gearing may account for between 21 to 24% of priced or systematic risk.

Virtually all ITCs have some elements of gearing. However to obtain a noticeable effect on performance the amount of borrowing

65. F. Modigliani, M. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment", *American Economic Review*, June, 1958, 48, pp. 261-297.

66. M. Miller, "Debt and Taxes", *Journal of Finance* (32), 2, May 1977.

67. R. Hamada, "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks", *Journal of Finance*, 1972, pp 435-452.

may have to be considerable. Thus the debt instruments involved tend to be debentures or loan stock and usually secured. A characteristic for such instruments is that they are essentially long-term. In taking on this form of funding then management are "betting" not on short term market fluctuations but rather on their long-term investment strategies. This of course exposes the geared ITCs to short-term market falls. To meet this danger many ITCs cover an anticipated bear market by switching from equities to either cash or gilt-edged securities. If anticipations are realised this will effectively neutralise the disadvantages of being geared in a bear market.

Table 1(xv) details the gearing levels for the 101 largest ITCs.

As the data in Table 1(xv) is based on account year ends which vary considerably from ITC to ITC any conclusions must be considered tentative. It is apparent that adjusting for the fixed interest elements in ITC portfolios substantially reduces and in many cases removes completely any gearing effects. Indeed the average gearing level is reduced from 8% of gross assets to 1%. However these average figures hide the very real differences in gearing levels between different ITCs. On an "actual gearing" basis the range is from 0 to 29% of gross assets while on the "effective" basis the range is -17% to 16%. There is no single explanation of these differences. While the data problem noted above is undoubtedly important other factors such as differences in international exposure

TABLE 1 (xv)

Investment Trust Companies											
Gearing Levels as a Percentage of Gross Assets											
Accounting Year-Ends - 1980											
(101 ITCs)											
Trust	% Gross Assets	Effective % Gearing	Trust	% Gross Assets	Effective % Gearing	Trust	% Gross Assets	Effective % Gearing	Trust	% Gross Assets	Effective % Gearing
Aberdeen Trust	2	0	Continental Union	12	9	Investing in Success	16	-1	Scottish American	7	1
Alliance Investment	20	8	Drayton Commercial	6	2	Investors' Capital	13	4	Scottish Eastern	4	0
Alliance Trust	3	-8	Crayton Consolidated	9	-1	Keystore	6	1	Scottish Investment	12	-1
American Trust	3	-6	Drayton Premier	5	0	Lakeview	4	3	Scottish Mortgage	2	-2
Anglo-American Sec.	5	0	Edinburgh American	18	1	London & Holyrood	2	-1	Scottish National	9	-7
Anglo-Scottish	15	-2	Edinburgh Investment	18	10	London & Lomond	14	5	Scottish Northern	10	3
Ashdown	3	-2	Electric & General	4	-6	London & Montrose	1	-2	Scottish Ontario	2	-5
Atlantic Assets	12	-2	English & International	7	4	London & Provincial	2	0	Scottish United	14	10
Atlas, Electric & General	8	7	English & New York	2	-8	London Trust	29	16	Second Alliance	5	-9
Bankers	2	-4	English & Scottish	4	3	Mercantile	13	-7	Securities Trust	10	3
Berry	25	6	External	0	0	Merchants	1	-7	Sphere	10	3
Bishopgate	9	4	First Scottish Am.	6	6	Monks	8	7	Sterling	4	7
Border & Southern	2	1	Foreign & Colonial	20	8	Murray Caledonian	17	-1	Stockholders	5	0
British American & General	1	-13	General Consolidated	5	4	Murray Clydesdale	13	3	Temple Bar	3	-1
British Assets	13	3	General Funds	27	9	Murray Northern	4	0	Throgmorton	5	3
British Investment	3	-9	General Investors	14	-1	Murray Western	13	1	Trans-Ocean	3	-4
Broadstone	4	-1	General Scottish	12	-5	1928	7	3	Tribune	0	-13
Brunner	2	-4	Glasgow Stockholders	10	9	North Atlantic Sec.	7	9	Trust Union	9	8
Capital & National	2	-1	Globe	3	5	Northern American	11	7	Trustees	4	3
Cardinal	28	12	Great Northern	3	-7	Outwich	6	4	United British Sec.	1	-3
Cedar	2	4	Guardian	3	2	Pentland	3	-3	US and General	1	0
Charter Trust	5	-3	Hambros	10	-11	Raeburn	3	-6	US Debenture	2	0
Claverhouse	0	0	Philip Hill	8	5	Romney	7	5	Winterbottom	8	-1
CLRP	12	10	Industrial & General	6	6	RIT	29	-17	Witan	7	1
Colonial	3	-4	International	8	7	St. Andrews	6	-6	Yeoman	6	4
Continental & Industrial	8	-5									

Notes: 1. Source; L. Messel & Co.⁶⁸

2. The gearing elements consist of all prior charges valued at market

3. The effective gearing percentage is calculated as follows :

(Excludes convertibles).

Actual gearing level

Less : Fixed interest portion of the ITCs' portfolios

Plus : Nominal value of convertibles

Effective gearing level

x
<x>
x
xx

requiring different levels of borrowing and indeed different managerial expectations as to interest rates and market conditions will also be relevant.

From the late sixties onwards rising interest rates made it extremely difficult for ITCs to take profitable advantage of their gearing potential. Indeed this is to some extent borne out by the quite conservative levels of gearing indicated by Table 1(xv). However even at these low levels interest changes accounted for up to approximately 20% of the sector's gross revenue.⁶⁹

Some idea of the various types of debt instruments used by ITCs during the nineteen seventies can be gained from Table 1(xvi).

We have included convertibles and preference stock in this table. As they have characteristics common to both ownership and debt instruments the decision of including them under either equity or debt rather depends on the purpose of the analysis.

Overseas loans are the largest single element and they represent an alternative although as we note later a less preferred route to foreign securities compared to the purchase of investment currency. We deal in detail with these items in Chapter 2 .

However perhaps the most important point to emerge from Table (xvi) is confirmation that gearing levels have for the reasons noted above been extremely low during the nineteen seventies. We summarise

69. Wood Mackenzie & Co., Investment Trust Annual, 1980.

TABLE (xvi)

<u>Investment Trust Companies</u> <u>Outstanding Prior Charges at Market Value</u> (150 ITCs)			
			£m (%)
Debt Instrument	31/12/76	30/11/78	31/10/79
Convertibles	150.4 (15)	86.3 (9)	53.6 (7)
Overseas Loans;	418.9 (44)	495.8 (51)	366.1 (45)
Back to back & Swaps	99.8	85.6	66.5
EEC Supplement 35	N/A	27.4	10.7
Multi-Currency	319.1	382.8	288.9
Debentures;	245.3 (26)	224.1 (23)	235.2 (29)
Redeemable	213.3	192.8	203.4
Irredeemable	32.0	31.3	31.8
Preference Stocks	132.8 (14)	127.2 (13)	128.6 (16)
Other	14.2 (1)	36.1 (4)	30.0 (3)
TOTALS	961.6 (100)	969.5 (100)	813.5 (100)

Notes : 1. Source, Wood Mackenzie & Co.⁷⁰

⁷⁰. Wood Mackenzie & Co. Investment Trust Annual 1980.

the sector gearing levels for 31/12/76, 30/11/78 and 31/10/79 in Table 1(xvii).

TABLE 1(xvii)

Investment Trust Companies			
<u>Gearing Levels</u>			
(%)			
Gearing	31/12/76	30/11/78	31/10/79
Prior Charges/ Gross Assets	16	15	11

Notes : 1. Source : Tables 1(iii) and 1(xvi)

(iii) Investment Strategies : ITC portfolios represent the raw material input for the repackaged claims we described earlier. We noted that historically ITCs had exploited the interest arbitrage opportunities that arose between the U.K. and foreign fixed interest securities but that this had given way in the post-war period to strategies based primarily on equity participation. The extent to which equities dominated ITC portfolios in the 1970s can be seen from Tables 1(xviii) and 1(xix). The data for these tables is sourced from CSO and Bank of England publications and covers ITCs comprising virtually the whole sector.

TABLE 1 (xviii)

Investment Trust Companies										
Investments at December 31										
1971 - 1980										
(£m)										
Asset Caption	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Short-term Assets										
U.K.	136	281	460	558	347	345	268	321	250	200
Non-U.K.	22	37	95	112	37	52	37	62	66	64
Short-term Liabilities										
U.K.	52	116	110	55	53	61	68	49	45	60
Non-U.K.	6	16	57	47	12	14	14	19	28	16
Net Current Position	100	186	440	611	319	322	223	315	243	188
Gilts	105	64	65	82	158	164	321	232	260	234
Local Authority Securities	1	2	25	25	11	6	5	3	2	-
Overseas Government Securities	1	1	2	24	7	4	2	28	2	2
<u>Total Public Sector Securities</u>	107	67	92	131	176	174	328	263	264	236
U.K. Company Securities										
1. Quoted; Loan	113	168	110	54	76	84	95	68	42	30
Preference	80	73	55	37	46	48	54	61	40	39
Ordinary	3547	4099	2560	1148	2606	2584	3591	3513	3251	3758
2. Unquoted; Loan	20	23	20	17	23	17	21	28	13	18
Preference	10	11	10	8	8	7	7	11	12	23
Ordinary	97	162	160	171	183	127	138	156	158	250
3. Other	42	62	65	86	179	79	87	91	116	111
<u>Total U.K. Company Securities</u>	3909	4598	2980	1521	3021	3021	3993	3928	3632	4229
Non U.K. Company Securities										
Loan	45	62	50	41	65	93	70	74	55	74
Preference	24	20	23	21	16	19	12	12	8	12
Ordinary	1545	2553	1990	1385	2016	2459	1891	1999	1766	2696
Other	29	29	23	29	37	53	47	85	27	23
<u>Total Non-U.K. Company Securities</u>	1643	2664	2086	1476	2134	2624	2020	2170	1856	2805
<u>Net Assets - Total</u>	5759	7515	5598	3739	5650	6066	6564	6676	5995	7458

Notes : 1. Sources, Bank of England, Quarterly Review⁷¹
Financial Statistics⁷²

71. Bank of England Quarterly Review - Various Issues 1970-1978.

72. Financial Statistics (C.S.O.) - Various Issues 1975-1980.

TABLE 1(xix)

Investment Trust Companies										
Investment Proportions; Summary Statistics										
1970 - 1980										
Category	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
A) <u>Balance Sheet Categories</u> :										
Net Current Position	2	2	8	16	6	5	3	5	4	2
Public Sector Securities	2	1	2	4	3	3	5	4	4	3
Corporate Securities	96	97	90	80	91	92	92	91	92	95
B) <u>Fixed Interest and Equity</u> :										
Fixed Interest	9	8	14	25	13	13	14	12	11	8
Equity	91	92	86	75	87	87	86	88	89	92
C) <u>Quoted and Unquoted</u> :										
Quoted	97	96	95	92	94	97	95	94	95	96
Unquoted	3	4	5	8	6	3	5	6	5	4
D) <u>U.K. and Foreign</u> :										
U.K.	71	64	61	57	62	56	69	66	68	62
Foreign	29	36	39	43	38	44	31	34	32	38

Notes : 1. Source : Table 1(xviii)

It is clear from these tables that corporate securities and in particular quoted corporate equities consistently dominated ITC portfolios throughout the decade. Noteworthy is the 1974 portfolio composition. As we detailed above December 1974 represented the lowest point in the bear crash of that year. However while there will obviously be differences between ITCs the overall move to liquidity although significant was not dramatic. The net current position went to 16% and the fixed interest involvement to 25%. Corporate securities however still accounted for 80% of assets with equities alone accounting for 75% of assets.

The allocation of ITC portfolios between quoted and unquoted securities emphasises just how small is the sectors' involvement with off-market securities. Again there will be variations between ITCs which would hide the extent of a particular management's involvement. In addition the unquoted exposure is usually measured at the lower of cost or directors' valuation which may well understate the true economic value of these investments. However given the publicity that very often surrounds an ITC involvement in unquoted situations it is revealing that the sector's involvement as a whole is so limited. It could well be that the institutional pressure is to deliver dividend dominated products noted previously has mitigated against allocating search expenditure for the possibility of capital dominated returns.

The international exposure of many ITC portfolios is well known and indeed this is reflected in U.K. ; non.U.K. portfolio proportions described in Table 1(xix). Foreign investments accounted for more than 30% of the sectors' assets in seven of the 10 years. Given

the difficulties of investing abroad caused by the premium currency pool it is perhaps surprising that non-U.K. exposure was maintained at such a high level. Undoubtedly traditional expertise in dealing with foreign investments and the perceived benefits of international diversification were important factors in sustaining foreign portfolio levels. Table 1(xx) details the geographical spread achieved by the sector during the decade.

The U.S. was clearly the main recipient of ITC funds. Indeed 20 to 25% of the sector's assets were deployed there. The U.S. markets in terms of size dominate those of other countries and therefore a substantial U.S. concentration is to be expected. Australia and Japan provided opportunities for the bulk of the remaining international funds.

A critical variable in maintaining a foreign portfolio is the additional risk implied by currency movements. The most practical way of insuring against this is to match currency investments with currency borrowings. Table 1(xxi) gives a very approximate comparison between foreign assets and foreign funding.

It is clear from Table 1(xxi) that the bulk of foreign security purchases were made through the premium market and not by foreign currency borrowing. The risk reduction properties of hedging were apparently less than the costs of gearing. We return to this area in chapter 2 and deal in detail with the alternative methods of gaining foreign exposure.

TABLE -I (xx)

<u>Investment Trust Companies</u> <u>Geographical Spread of Non-U.K.</u> <u>Investments; As a Proportion of Total Assets</u> <u>December 31, 1971 - 1980</u>										
										(%)
Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
U.S.	19	20	21	22	22	26	19	18	18	22
CANADA	2	2	3	4	3	3	2	2	2	3
E.E.C.	N/A	3	4	3	3	3	2	2	2	2
JAPAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	5
AUSTRALIA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	2	2
STERLING AREA	4	6	6	6	5	4	3	N/A	N/A	N/A
OTHER	4	5	5	8	5	8	5	9	5	4
TOTAL	29	36	39	43	38	44	31	34	32	38

Notes : 1. Sources : As per Table I(xviii)

TABLE 1(xxi)

<u>Investment Trust Companies</u> <u>Foreign Debt & Foreign Assets</u> <u>31/12/76, 30/11/78, 30/10/79</u> (£m)			
Description	31/12/76	30/11/78	30/10/79
Foreign Assets	2669.0	2269.8	1918.4
Foreign Funding	418.9	495.8	366.1

Notes : 1. Source : Tables 1(xvi) and 1(xviii)

International diversification has traditionally been accompanied by sector diversification. The concept of risk spreading has been an important aspect of ITC management and provides a promotional base for the sector's appeal to the individual investor in particular. Until recently it was difficult to find any ITC where the portfolio distribution did not include securities from virtually all the main stock market sectors. However towards the end of the decade some of the smaller ITCs made moves to specialise in the more technologically complex investment areas. A particularly attractive investment area given the two oil crises of the nineteen seventies was energy and several ITCs developed substantial interests in this sector.

While diversification is still seen as an important aspect of the intermediation service offered by ITCs this is now being achieved with a smaller number of securities than has previously been the case. Indeed based on the available published information for the one hundred largest ITCs the average number of securities per portfolio has dropped from 308 in 1971 to 216 in 1980. Interestingly, and it is an area to which we return, results based on modern portfolio theory suggest that adequate diversification may be obtained with as few as 20 or 30 securities.

In addition to diversification most ITC managers maintain that a decision to use an ITC intermediation vehicle is essentially a long-term investment decision. ITC management in assessing the various investment opportunities is not it is suggested actively trading securities for short-term gains. Instead investment decisions are reached on the basis of long-term considerations. Thus in order to gain the full rewards of management endeavours shareholders in turn should not actively trade their ITC holdings. Given the assumed efficiency of capital markets this of course would not be considered a theoretically valid claim. Indeed attempts to distinguish between the short and long term could be viewed as attempts to cover poor management performance! Whether or not investors consider an ITC investment as long term or not they will certainly be interested in the portfolio trading strategies and the resulting expenses incurred by managers.

(iv) Management Intermediation Costs : The use by investors of the intermediation services offered by ITCs is not a costless exercise.

The three most obvious costs are trading expenses, management expenses and tax charges. We deal with taxation in Chapter 2. From an accounting point of view trading expenses are capital items dealt with through the balance sheet. Indeed these expenses are invariably netted off against the investment realization account and are not shown separately. The majority of ITC managers would consider the disclosure of such information imprudent. However following various informal discussions with managers it would appear that trading expenses would approximately double the disclosed management expenses.

ITC income statements highlight management expenses as a general caption including salaries, administration expenses, investment search fees etc. With the independent ITCs these will be the actual expenses incurred. However management groups very often charge central expenses to member ITCs on a contractual basis. Table 1(xxii) details the management expenses incurred by the 101 largest ITCs.

At first glance the level of management expenses being incurred by ITCs is reasonably moderate. Approximately 6% of gross revenue as an allocation to cover operating expenses would not appear excessive. However ITC managers consider such expenses as a critical operating variable. The reason for this is not difficult to identify. Indeed given the comments noted earlier it is clear that institutional investors with their preference for income may well actively pressure ITCs to minimise these expenses. In addition as many institutions have their own equity research departments they will tend to place a limited value on the intermediation expenses incurred by ITCs.

TABLE 1 (xxii)

ITCs - Management Expenses as a Percentage of Gross Assets and Gross Revenue (101 ITCs 1980 Accounting Year)											
Trust	Gross Assets	Gross Revenue	Trust	Gross Assets	Gross Revenue	Trust	Gross Assets	Gross Revenue	Trust	Gross Assets	Gross Revenue
Aberdeen Trust	0.293	5.21	Continental Union	0.389	6.15	Investing in Success	0.455	9.37	Scottish American	0.360	5.62
Alliance Investment	0.476	7.90	Drayton Commerical	0.388	5.46	Investors' Capital	0.334	5.47	Scottish Eastern	0.236	3.75
Alliance Trust	0.200	3.29	Drayton Consolidated	0.320	5.29	Keystone	0.454	4.98	Scottish Investment	0.226	4.27
American Trust	0.418	7.76	Drayton Premier	0.355	4.98	Lakeview	0.367	5.22	Scottish Mortgage	0.299	4.50
Anglo-American Sec.	0.249	3.70	Edinburgh American	0.429	11.34	London & Holyrood	0.348	5.74	Scottish National	0.273	5.94
Anglo Scottish	0.456	7.28	Edinburgh Investments	0.239	3.99	London & Lomond	0.433	6.11	Scottish Northern	0.402	6.82
Ashdown	0.437	6.85	Electric & General	0.420	8.20	London & Montrose	0.258	5.65	Scottish Ontario	0.356	4.94
Atlantic Assets	0.546	11.31	English & International	0.485	6.23	London & Provincial	0.236	3.96	Scottish United	0.312	5.51
Atlas, Electric & General	0.287	4.34	English & New York	0.345	4.99	London Trust	0.478	6.76	Second Alliance	0.195	3.67
Bankers	0.377	4.95	English & Scottish	0.478	7.15	Mercantile	0.320	4.37	Securities Trust	0.301	4.08
Berry	0.394	8.68	External	0.481	5.94	Merchants	0.319	4.97	Sphere	0.277	4.14
Bishopgate	0.281	4.17	First Scottish Am.	0.245	3.85	Monks	0.321	5.06	Sterling	0.300	4.62
Border & Southern	0.295	6.37	Foreign & Colonial	0.338	6.51	Murray Caledonian	0.301	6.76	Stockholders	0.418	6.82
British American & General	0.449	5.66	General Consolidated	0.357	4.21	Murray Clydesdale	0.301	6.93	Temple Bar	0.411	4.38
British Assets	0.483	7.74	General Funds	0.393	8.37	Murray Northern	0.442	8.52	Throgmorton	0.475	5.67
British Investment	0.252	3.70	General Investors	0.653	9.35	Murray Western	0.319	6.13	Trans-Ocean	0.363	5.93
Broadstone	0.364	5.60	General Scottish	0.533	6.96	1928	0.355	4.08	Tribune	0.428	7.24
Brunner	0.355	5.40	Glasgow Stockholders	0.363	6.77	North Atlantic Sec.	0.219	4.31	Trust Union	0.295	4.45
Capital & National	0.271	5.27	Globe	0.509	5.90	Northern American	0.226	3.69	Trustees	0.286	4.52
Cardinal	0.531	8.28	Great Northern	0.281	3.68	Outwich	0.328	5.30	United British Sec.	0.173	3.44
Cedar	0.344	5.97	Guardian	0.252	3.79	Pentland	0.345	4.94	U.S. & General	0.309	4.47
Charter Trust	0.407	5.26	Hambros	0.316	6.45	Raeburn	0.324	4.33	U.S. Debenture	0.411	5.42
Claverhouse	0.388	4.90	Philip Hill	0.350	4.25	Romney	0.349	4.99	Winterbottom	0.452	7.44
CLRP	0.400	7.07	Industrial & General	0.202	3.20	RIT	0.145	2.98	Witan	0.363	6.04
Colonial	0.531	8.04	International	0.327	4.96	St. Andrew	0.378	5.16	Yeoman	0.557	6.96
Continental & Industrial	0.291	3.58									

- Notes: 1. Source : L. Messel & Co.⁷³
 2. Averages (i) Management Expenses/Gross Assets - 0.35%
 (ii) Management Expenses/Gross Revenue - 5.67%.

73. L. Messel & Co., Investment Trust Companies, 1980.

(iii) Aspects of ITC Intermediation Services : We now turn to consider the intermediation services offered by ITCs during the 1970s. We do this under the two intermediation categories suggested in Section 1 namely transaction costs and information costs.

(i) Transaction Costs : The following four areas of transaction costs were identified as providing a potential rationale for intermediation in general

- taxation
- economies of scale
- stockbroking commissions
- jobbers' spreads.

Although we deal in detail with taxation in Chapter 2 it is already clear that compared to other equity intermediation vehicles ITCs do not provide a tax efficient savings route. In looking at the potential for economies of scale in relation to information production and assimilation the pooling of investment funds may well lead to scale based cost reductions. However given the doubts about the extent of such economies of scale for management groups it may well be that these benefits are more appropriately considered in relation to the independent ITCs.

As we noted earlier the minimum commission system favours the management of large portfolios and to the extent that ITCs do not undertake excessive portfolio changes this is an area of cost efficiency. This efficiency has particular relevance in the context of MPT where ITC equity may provide investors with

cost effective access to a diversified portfolio. On the other hand, given the rules of the stock exchange, it is unlikely that on a transaction cost basis ITCs have any particular advantage over other investors as regards the purchase of the liquidity services provided by jobbers.

We find it difficult to establish a significant role for ITCs based solely on an ability to exploit the transaction cost function. There are certainly benefits available through the pooling of investment funds but these benefits are common to most other equity intermediaries. In addition the tax inefficiency of using ITCs would very probably outweigh any scale benefits.

- (ii) Information Costs : As we suggested earlier the production of information that can be used privately to construct portfolios is a possible intermediation rationale and indeed one that is particularly applicable to ITCs. The information produced could be used for a variety of portfolio purposes including security selection, market timing and the maintenance of well diversified portfolios. Given the increasing presence of small and sometimes unquoted investments in many ITC portfolios it could be argued that an additional effect of information production is the dissemination of information about these companies. Any resulting increase in marketability is clearly beneficial to the company.

Unfortunately the problem of signalling information quality remains. To some extent past performance may act as a signal. However this may be but a poor guide to the future. In addition ITC managers do not usually hold the size of equity interest in

the ITCs they manage implied by our earlier arguments.

Interestingly it is widely known that ITCs are considered as first class bank customers and can usually raise loans and establish facilities in many different currencies with relative ease. Clearly elements of signalling are present but the format is more complex than mere equity stakes.

We suggest that although transaction costs may well have a role to play the production and use of information is at the centre of the ITC intermediation service. The precise form that the production of information takes will vary from ITC to ITC. As we noted above some managers may prefer to exercise skills at security selection others at diversification and still others may attempt to time markets.

Finally we note, perhaps a little nervously, that although we have taken a positive view that ITCs do in fact have an intermediation role to play we do recognise the strong alternative hypothesis that there may not in fact be such a role! Writing in a different context Miller has noted that;

"... neutral mutations that serve no function but do no harm can persist indefinitely"⁷⁴

Summary : In this chapter we have developed and explained the principal characteristics of financial intermediation under the two headings of transaction costs and information costs. From this position we reviewed both the history of ITCs in general and the decade of the nineteen seventies in particular. Finally we suggested the relevance of the various aspects of financial intermediation discussed to ITCs.

74. M. Miller, "Debt and Taxes", Journal of Finance, 32, No. 2, May 1977.

THE SCOTTISH AMERICAN INVESTMENT TRUST.

ISSUE of £150,000, in CERTIFICATES of £100 EACH at PAR,
of which a large portion has been already subscribed.

The Certificates will bear interest at £6 per cent. per annum, payable Half-Yearly, on 1st May and 1st November in each year, at the Head Office, or any of the Branches of the British Linen Company's Bank, in Scotland, or at Messrs Smith, Payne, & Smith's, London.

The first Coupon of £3 per Certificate will be payable on 1st November 1873.

A portion of the Certificates will be redeemed annually out of surplus income to the extent of the available Funds, by Tender from the Certificate Holders.

The Trust to terminate at the end of ten years, when the Investments will be realized, and the proceeds divided *pro rata* among the holders of the Certificates remaining unredeemed.

Trustees.

THOMAS H. COX, Esq. (Messrs Cox Brothers, Dundee.)
JOHN GUILD, Esq. (Messrs J. & R. Guild, Dundee.)
JOHN SHARP, Esq., Dundee.
THOMAS SMITH, Esq. (Messrs Henry Smith & Co., Dundee.)

Bankers.

THE BRITISH LINEN COMPANY'S BANK.

Solicitors.

Messrs SHIELL & SMALL, 5 Bank Street, Dundee.

Brokers.

ANDREW OGILVIE, Esq., Royal Exchange Buildings, Dundee.
Messrs W. & R. RITCHIE, 6 Panmure Street, Dundee.
RICHARD A. MILLER, Esq., 27 Panmure Street, Dundee.
ALBERT BAXTER, Esq., Meadowside, Dundee.

Secretary.

Mr ROBERT FLEMING.

Temporary Offices.

1 ROYAL EXCHANGE PLACE, DUNDEE.

On Friday, 7th February, 1873 a prospectus was published in the Dundee Courier and Argus and the Dundee Advertiser inviting the subscription of £150,000 for a new Trust to be called "The Scottish American Investment Trust," whose funds would be "invested solely in the Bonds of States, Cities, Railroads and other corporations and undertakings in the United States, but chiefly in the Mortgage Bonds of Railroads there."

The great movement to the West was under way in America and demand for money to finance railroad construction was high. Robert Fleming, later to found the Merchant Bank that bears his name, was then confidential clerk to the Chairman of Baxter Brothers, a firm of jute spinners in Dundee, and following a visit to the U.S.A. in 1870 he became enthusiastic about the possibilities that existed for investment in that country. It was decided that an investment trust would be the best medium for this, and under his guidance a trust deed was prepared, sponsored by a number of prominent local men, and a prospectus was produced setting out the detailed proposals so that members of the public could participate. Industry in Dundee had prospered during the American civil war, with the result that substantial funds were available locally.

The stated advantages of the Trust were the high rate of interest - six per cent - the distribution of risk by spreading the funds over a number of investments and the prospect of repayment of capital at a profit at the end of ten years. The public response to this invitation to provide funds for professional investment management was a substantial oversubscription as a result of which an amended prospectus was issued on 10th February, 1873 increasing the size of the Trust to £300,000. This again was oversubscribed.

The enthusiastic reception given to this issue led to a flood of similar flotations elsewhere, and in consequence it is regarded by many as marking the start of the investment trust movement as we know it today, although it was not in fact the first investment trust, being partly modelled on the Foreign & Colonial Trust which had been founded five years previously in London.

A financial crisis developed on Wall Street shortly after the formation, and it is a tribute to the early management that the investments performed well during the difficult initial period.

Two almost identical issues were made in the following two years described as the "Second Issue" and the "Third Issue" of The Scottish American Investment Trust respectively, and then in 1879, in view of doubt cast on the legal status of similar trusts in England, the three issues were incorporated as separate limited companies called the First Scottish American Trust Company Limited, The Second Scottish American Trust Company Limited and The Third Scottish American Trust Company Limited with similar capital structures consisting at that time entirely of Ordinary Stock.

In 1910 the investment powers were extended to include Stocks and Bonds of companies in the U.K. and the Western Hemisphere. At the same time, partly because a sister Company, The Northern American Trust Company Limited, whose more modern capital structure included fixed interest securities, was increasing its revenue more rapidly than this Company, borrowing powers were introduced and issued of Debenture Stocks followed shortly thereafter. These were relatively substantial, no less than £250,000 Debenture Stock being issued in one year at a time when the valuation of investments was

only £620,000. The next major change took place in 1927 when the Ordinary Capital was divided into Ordinary and Preference Stock, the effect being to reduce the nominal amount of Ordinary Capital from £300,000 to £120,000. These measures, and subsequent issues of Debenture Stocks over the years created very high gearing which caused considerable concern during the difficult years of the thirties, but also made possible the very rapid increase in the net asset value per Ordinary Share which took place after the Second World War.

During all this time the policies of the three Companies were identical. Indeed on some occasions in the early days meetings of the Stockholders of all three were held simultaneously, and more than once reference was made at the meeting of one Company to decisions which had been taken in the case of the others. The desirability of amalgamating them was discussed at intervals throughout their existence, but it was not until 1970 that this step was finally taken and the Second and Third Companies were merged into this Company by means of a Scheme of Arrangement.

Now, one hundred years after its inception, the Company has investments of well over £40,000,000 and almost 6,000 Ordinary Shareholders as well as about 4,000 holders of the different categories of fixed interest stock.

It is interesting looking back over the years to note some of the major changes in emphasis and policy which have taken place. For example until 1910 the portfolio was entirely invested in fixed interest securities and thereafter the percentage in equities grew slowly. Twenty years later the Company still had only 20% in Ordinary Shares, and in 1938 39%. By 1948 this proportion had risen to 56% and the equity percentage has risen steadily since then to the present, an almost total reversal of the original state.

Big changes have also taken place in the areas chosen for investment. The initial portfolio was invested entirely in securities in the U.S.A. (where the pound at that time commanded a premium over the dollar) and this continued until the early years of this century when growing percentages in South America and Cuba were recorded, but the percentage in the U.K. was still minimal. At the beginning of the 1914-18 War a proportion of the U.S. securities were sold and reinvested in U.K. Government securities for patriotic reasons and the balance of the U.S. securities were deposited on loan with the Treasury. Between the Wars the funds in the U.S.A. remained at a low level, and in the years immediately before the outbreak of the Second World War the proportion there varied between twenty and thirty per cent. Incidentally, in 1938 when the valuation of The First Company was some £1.3 million, there were no less than 844 separate holdings.

During the Second World War virtually the entire U.S. portfolio was liquidated by the Government to provide dollars for the War effort, leaving the Company at the end of the War almost exclusively in U.K. investments. In the early post war years new considerations had to be taken into account. The dollar was very strong in relation to the pound and the now familiar dollar premium first came on the scene at this time and continued despite devaluation of the pound. As capital controls were eased the U.S. percentage was steadily built up again, and although the dollar premium and, more recently, currency surrender requirements and tax considerations have prevented a return to the very high historical percentages held in the U.S.A., a substantial part of the portfolio has been there ever since. The Company has for many years had Canadian holdings also, and in the last few years

investments in the flourishing economies of the Far East have made their appearance as well. The risks of investing in equities in such areas sometimes appear very great, but one should not be misled by the fact that the early investments were all in Bonds, into thinking that they were therefore risk-free. The first few years of the Trust coincided with heavy falls on Wall Street, particularly in railroad securities and it is amusing to see that the telegraphic code word chosen to report that all interest payments had been made on the due dates on the Trust's early holdings was 'MIRACULOUS.' Dollar loans were introduced in 1968 in order to increase the flexibility with which the dollar holdings could be switched, and in 1972 a Convertible Unsecured Loan Stock was issued.

CHAPTER TWO

THE INSTITUTIONAL PARAMETERS

Introduction

Section 1 : Statutory Environment

Section 2 : Tax Environment

Section 3 : Market Environment

Section 4 : Foreign Investment

Summary

INTRODUCTION : The provision of an ITC intermediation service is conditioned by several institutional parameters within which ITC managers must operate. It is very difficult to accurately quantify the effect of having to comply with regulations and indeed compliance does not necessarily imply cost. For example in the field of taxation there are considerable benefits to ITCs in organising their operations in such a way as to fall within the tax definition of an ITC.

Our objective in this chapter is therefore not a quantitative one. Rather we are concerned with describing the operating environment over which managers have no direct control but within which they must make decisions as to nature of the intermediation service they can best provide. An understanding of the operating environment is a necessary pre-requisite to any attempt at suggesting the current intermediation gap ITCs are best suited to fill.

This chapter is divided into the following four sections which we suggest represent the relevant aspects of the institutional environment.

1. Statutory Environment
2. Tax Environment
3. Market Environment
4. Foreign Investment.

1. Statutory Environment : As limited liability companies incorporated under one of several Companies Acts ITCs are like other incorporated companies subject to certain statutory controls. These statutory controls are mainly found in the Companies Act 1948. This Act codified and

extended both the then existing statute law and much of the relevant case law. Since 1948 there have been four more Companies Acts in 1967, 1976, 1980 and 1981. In addition further statutes may be required to enact legislation under the EEC's harmonisation of company law proposals. However in spite of these additional statutory instruments the 1948 Act remains very much the foundation of current company law with subsequent legislation best being considered as extending the legal parameters in certain specific directions.

While the Companies Acts deal with the general legal environment for all incorporated companies other statutes cover specific business areas. For example the problem of investor protection in the secondary markets is covered by the Prevention of Fraud (Investments) Act 1958. Other areas of statutory involvement include banking (Banking Act 1979), insurance (Insurance Companies Acts 1974, 1980, 1981, Policy Holders' Protection Act 1975, Insurance Brokers Registration Act 1977) and building societies (Building Societies Act 1962). There are no specific statutes controlling the operations of ITCs or indeed unit trusts although the latter are subject to rules issued directly by the Department of Trade.

In reviewing the statutory environment in which ITCs operate our approach is selective. We consider the following two areas to be of particular importance to ITCs.

- (i) Incorporation
- (ii) Reserves.

(i) Incorporation: The various implications that follow from incorporation are perhaps the most fundamental result of U.K. company law. We suggest that the implications that are of

most relevance to ITCs can be grouped into the following three broad categories - legal form, limited liability and market access. We deal with each in turn.

Following the decision in RE SALOMON it is clearly established that an incorporated company has its own legal personae.¹ The authority vested in this corporate legal persona is documented in what is loosely called the company constitution. The two main constituting documents are the Articles of Association and the Memorandum of Association. Very broadly the Memorandum of Association deals with the relationship between the company and the public while the Articles of Association provide the internal rules for the orderly running of the business.

A key aspect of all company constitutions is the objects clause in the Memorandum of Association. We dealt with management objectives in chapter 1. The statement of objectives included in the Memorandum is considerably more general and indicates the broad areas of business that the company can be involved in rather than the specific repackaging services being offered by management.

The importance of the objects clause in the Memorandum is that it sets out the activities that are legally within the remit of the company. Transactions undertaken outwith this remit are ultra vires and therefore null and void. This obviously puts a considerable burden on those having dealings with an incorporated company. It is their responsibility to ensure that any

1. RE SALOMON (1897), discussed in Charlesworth & Cain "Company Law" Ed. T. E. Cain, London (1972), chapter 1.

transactions they involve themselves in with the company can be legally enforced against the company. If the transactions are ultra vires enforcement will not be possible and irrecoverable losses may be incurred. Given the complexities and scale of the current business world the doctrine of ultra vires appears unduly onerous. Indeed both the Jenkins Report on company law reform and the current E.E.C. thinking in this area accept that it is not practical to expect those involved in dealings with companies to be continually referring to objects clauses before entering into business transactions.^{2,3} There is in fact a strong recommendation in the Jenkins Report that contracts made in good faith with companies acting ultra vires should not be invalid. As this is not U.K. law at present the doctrine of ultra vires retains its important place in corporate law.

The objects clause of a company can of course be altered although not retrospectively. The legal grounds for alteration which is by special resolution of numbers are as follows;

- " i To carry on the business more economically and efficiently.
- ii To attain a main purpose by new or improved means.
- iii To enlarge or change a local area of operations
- iv To carry on a business which under existing circumstances may be conveniently or advantageously combined with the business of the company.
- v To restrict or abandon any of the objects specified in the memorandum.

2. Jenkins Report (1962), Cmnd 1749, para 2.

3. E.E.C. Fourth Directive on Company Law Reform.

- vi To sell or dispose of the whole or any part of the undertaking.
- vii To amalgamate with any other company or body of persons."⁴

While generally allowing the alteration or abandonment of existing corporate objectives these "grounds" do not readily permit the addition of new objectives. To avoid ultra vires transactions corporate promoters attempt to ensure that "objects clauses" are as all embracing as possible.

The objects clause of an ITC would typically include the following.

- " i Dealing in property and all forms of securities.
- ii Participating in company promotions and the underwriting of new share issues.
- iii Participating in the financial operations of syndicates
- iv Dealing in life assurance policies - purchase or sales of and loans there on.
- v Making advances on, buying or selling or dealing in commission claims on land and property.
- vi Accepting, discounting and issuing promissary notes, bills of exchange and other negotiable instruments."⁵

In addition to a statement of objects the enabling documents of all ITCs will contain details of the various investment and borrowing powers available to the company. In particular the borrowing powers of ITCs must be specifically documented. Interestingly

4. Companies Act, 1948, S(5).

5. H. Burton, D.C. Corner, Investment and Unit Trusts in Britain and America. Elek Books. London, 1968, p.3.

this requirement is not nearly as rigorous for trading companies where some level of indebtedness is assumed necessary to attain corporate objectives.⁶

In order to take advantage of either certain tax concessions or of a stock exchange listing the Articles of Association of ITCs, must specifically limit their investment policies both in terms of certain types of investment and in their exposure to any one investment. While such restrictions on investment policies reflect current institutional regulations they have their roots firmly in the long historical tradition of investor protection promoted by the movement.

Not all financial intermediaries have an incorporated legal form. For example unit trusts are trusts in the strict legal sense. Funds managed under trust involve a more onerous responsibility on managers than funds managed under commercial circumstances. Gearing funds managed under trust is for example not permitted under trust law. Thus unit trusts cannot normally borrow.

The second implication of incorporation we consider is limited liability. The vast majority of incorporated companies including all the ITCs we are concerned with are incorporated with limited liability. However it is possible to have incorporation with either unlimited liability or by guarantee.⁷ The liability that is limited is not that of the company but of its shareholders. Thus to

6. RE GENERAL AUCTION ESTATE CO. (1891), 3 CH. 432.

7. Companies Act 1948, S(1).

the extent that a company has no uncalled amounts on equity in issue the downside risk of an equity involvement in the company is limited to the purchase price paid for the shares. Such shareholder protection is not usually available to either partnership participants or members of investment clubs. As creditors cannot "see through" a limited liability company to the underlying owners it is vital that the assets they can identify as belonging to the company and therefore available to meet any liabilities are not entirely distributable to the members. Indeed a considerable proportion of company law is concerned with the maintenance of what is often referred to as the "creditors' buffer" namely the company assets.

To the shareholder the benefits of limited liability are clear. Only in exceptional circumstances, usually related to fraud, can liabilities in excess of the purchase price be incurred. Thus if an ITC records substantial deficits there is no requirement on individual shareholders to make good the losses. This protection would be particularly important to the shareholder in a highly geared ITC or one that involved itself in investment situations where the potential liability was not limited. However we noted in chapter 1 that gearing levels in recent years have tended to be moderate and portfolios have been dominated by quoted equities. At least to this extent the protective shield provided by limited liability has not been particularly important. Historically however gearing has been at higher levels than at present. For example the arbitrage operations we described in chapter 1 involved significant levels of direct borrowing and in addition were often supported by an equity base that was only partly paid. Similarly there is some evidence that

highly speculative ventures involving not arbitrage operations but joint-venture or partnership stakes did attract ITC funds.⁸

The final implication of incorporation we consider is market access. Limited liability companies can be divided into private companies and public companies. The shareholders in a private company are restricted with respect to their total number and their ability to transfer shares. The majority of private companies are in fact small and very often owner-managed. Public companies do not suffer any of these restrictions and as a consequence their shares tend to be widely held and easily transferable.

Public companies themselves can be divided into two categories - those that have a stock exchange listing and those that do not. We are concerned only with ITCs that do in fact have a stock exchange quote.

Access to the stock exchange is of course important both in terms of raising new capital and in providing liquidity for investors. In addition as the product being supplied by ITC management is packaged into the ITC's own equity the stock exchange represents the market place for ITC services. It is important to note that in terms of making the ITC product available to investors as wide a market as possible is desirable. The stock exchange provides such a market. We deal in section 3 with the questions of the market environment.

8. T. Jackson, *The Enterprising Scot*. Edinburgh (1968).

The three implications of incorporation we have examined are those with the most direct relevance to ITCs. They do not however represent an exclusive list of the various effects of incorporation. There are many others including some that assist the day to day operations of ITCs. For example incorporation allows ITCs to hold title to assets, to enter into contracts and to undertake other legal obligation in the name of the ITC.

- (ii) Reserves : The reserves of ITCs occupy the most important and perhaps the most controversial place in any discussion of the institutional parameters within which ITCs must operate.

Reserves can be divided into capital reserves and revenue reserves. The capital reserves of ITCs include the share capital, the net profits and losses on portfolio realisations and the balancing adjustments required to show investments at market value. The revenue reserves represent the net income retentions after distributions.

By far the most important legal aspect of reserves for all incorporated companies is the distinction between the reserves that are distributable and those that are not. We noted above that creditors can only look to the company for settlement of any outstanding liabilities and not to the underlying equity holders. It is important then that the claims equity holders have over the reserves of companies be restricted in order that distribution policies do not adversely affect the claims of other interested parties. Until the Companies Acts 1980 and 1981 statute law

gave very little guidance either on the distributional status of different reserves or on whether distributable reserves were confined to those that had been realised. Exhibit 2(i) summarises the position prior to the Companies Act 1980.

EXHIBIT 2(i)

The Availability of Corporate Reserves
for Distribution

(Prior to the Companies Act 1980)

1. Share Capital : (i) Only distributable for certain strictly defined purposes usually connected with capital reorganisation schemes.
- (ii) Court approval required before any distribution can be made.
2. Other Reserves : (i) There must be a reserve surplus from which a distribution can be paid.
- (ii) A current year surplus can support a dividend even although the balance on the accumulated reserve is in deficit.
- (iii) A past surplus can support a dividend even although a current loss has been reported.
- (iv) In England an unrealised surplus can support a dividend. In Scotland the surplus must have been realised.

It is clear from Exhibit 2(i) that while share capital can only be reduced in certain closely defined circumstances the distribution of other reserves was less restricted. In practice and for reasons related to investor rather than creditor protection the constituting documents of most ITCs tend to be more restrictive than is laid down by statute. For example capital distributions are not considered prudent. We deal with investor protection below.

A major attempt was made in the 1980 Act to determine a set of rules for calculating distributable profits. The basic rule is as follows;

"... a company's profits available for distribution are its accumulated, realised profits, so far as not previously utilised by distribution or capitalisation, less its accumulated, realised losses, so far as not previously written-off in a reduction or re-organisation of capital ..." ⁹

However to guard against the possibility of a company with accumulated net profits but severe liquidity difficulties attempting to make a distribution the Act includes the following distributional restrictions;

"... a public company may only make a distribution at any time -

- (a) if at that time the amount of its net assets is not less than the aggregate of the company's called-up share capital and its undistributable reserves; and
- (b) if, and to the extent that, the distribution does not reduce the amount of those assets to less than that aggregate." ^{10,11}

The main points of change introduced by the 1980 Act are as follows :

9. Companies Act 1980 S(39) para 2.

10. Companies Act 1980 S(40) para 1.

11. A method of calculating undistributable reserves is given for this specific section in S(40) para 2.

- (i) There must be a net balance of accumulated profit;
- (ii) This profit must be realized;¹² and
- (iii) There is an absolute limit on the level of distributions.

As it stands the above sections of the 1980 Act represent a useful codification and extension of the law. However this usefulness was noted at the drafting stage as being rather limited in regard to ITCs. Two problems were identified. First of all for distribution purposes these rules effectively removed any requirement to distinguish between capital and revenue reserves. This distinction as we noted above and will develop below is important to ITCs. Secondly since 1970 there had been a tax definition of an ITC which if complied with resulted in a substantial reduction in the tax intermediation cost of using an ITC. In particular under the tax definition capital dividends were not allowed and a high rather than a restricted pay-out ratio was required. We deal with taxation in detail in the following section.

Clearly the situation where two statutes presented both different definitions of distributable reserves and indeed took opposite views as to the level of these reserves available for distribution was undesirable. Indeed while it was certain that ITCs taking full advantage of the 1980 Act would be in breach of both their Articles of Association and the Taxes Act it was also possible that certain ITCs especially those with objectives of capital growth could in maintaining a high pay-out ratio as per the Taxes Act infringe the restricting provisions of the 1980 Act.

12. While this is the general rule there are statutory exceptions.

In order to avoid these problems 1980 Act defined "investment companies" as a category of company distinct from other incorporated companies and prescribed separate distribution rules for them. The definition and rules are as follows;

- Definition : "(i) That the business of the company consists of investing its funds mainly in securities, with the aim of spreading investment risk and giving members of the company the benefit of the results of the management of its funds.
- (ii) That none of the company's holdings in companies other than companies which are for the time being investment companies represents more than 15% by value of the investing company's investments.
- (iii) That distribution of the company's capital profit is prohibited by its memorandum or articles of association.
- (iv) That the company has not retained otherwise than in compliance with this Part of the Act, in respect of any accounting reference period more than 15% of the income it derives from securities."¹³

- Rules : "... an investment company may also make a distribution at any time out of its accumulated, realised revenue profits, so far as not previously utilised by distribution or capitalisation, less its accumulated revenue losses (whether realised or unrealised) so far as not previously written off in a reduction or reorganisation of capital duly made -
- (a) if at that time the amount of its assets is at least equal to one and a half times the aggregate of its liabilities and
- (b) if, and to the extent that the distribution does not reduce that amount to less than one and a half times that aggregate."¹⁴

As the above definition is broadly the same as that for tax purposes the possibility of statutory conflict has been removed. Similarly,

13. Companies Act 1980 S(41) para 4.

14. Companies Act 1980 S(41) para 1.

the separate rules provide a practical limit on distribution policies that is reasonable for all ITCs irrespective of their stated management objectives.

Following the 1980 Act it is now established that a key definitional characteristic of ITCs is the provision specifically prohibiting capital dividends. More recently this has led to a considerable difficulty in relation to one particular component of capital reserves namely share capital. Share capital has always occupied a special place in company law. It represents the very minimum level of assets that a potential creditor could expect a company to have available to meet its business liabilities. Indeed it is clear from the definitions of distributable reserves for both investment companies and other companies described above that share capital does not represent an accumulated surplus and therefore it is not available for distribution. To this extent the 1980 Act confirmed both accepted practice and the earlier 1948 Act. We noted in Exhibit 2(i) the very restrictive conditions under which share capital could be reduced.

However from the mid-1970s onwards arguments developed suggesting that there were certain additional situations in which it may be appropriate for share capital to be reduced. In particular the 'mature industry' argument gained a significant following. It was argued that the level of new profitable opportunities in a particular line of business may eventually decline to the point where they were either very few in number or did not command an adequate level of return. A company faced with this problem had two alternatives. It could either diversify into other business areas or it could merely accumulate liquid surpluses from its existing investment programmes. These two alternatives were

exemplified by B.A.T.s and G.E.C. respectively. There were considerable doubts as to the potential benefits of the diversification alternative. These centred around both the practical difficulties of building up management expertise in a business area new to the company and the perhaps more telling arguments that the company's shareholders may well be able to mirror the diversification achieved by their company through operating in the stock market themselves. Indeed there is no prima facie case that if the company distributed its surplus funds then shareholders would not be at least as efficient in achieving a similar level of diversification to that planned by their company.

The alternative strategy of accumulating cash surpluses suffered from disadvantages too. In particular the only way to distribute these reserves is by dividends which could attract higher rate tax and investment surcharge in the hands of shareholders.

As the "mature industry" problem was essentially one of what to do with the "fruits of success" given the limited opportunities in the company's chosen area of operations the solution appeared to be some method whereby the company could be reduced in size through a tax efficient distribution to shareholders. The specific suggestion was that surplus funds should be applied to purchasing the company's own equity. This it was argued would involve a capital receipt to shareholders and would therefore attract lower rates of tax. In addition shareholders would be free to reinvest or not as they wished.

While carefully avoiding the implication that ITCs had outlived their usefulness many ITC managers were quick to note the effect that such

redemption schemes would have for ITCs. As the price of ITC equity usually stands at a discount to the net asset value of the underlying portfolio the redemption of an ITC share would increase the net value of the fund to the remaining shareholders by the amount of the discount. The possibility of gains through re-purchase would be quickly recognised by the market resulting in ITC prices moving upwards towards the underlying net asset values. To the extent that many ITC managers perceive the discount as a key performance indicator the possibility of reducing it through a systematic redemption of equity was attractive. The attraction lay not in the possibility of completely eliminating the discount. Indeed this would only occur with a redemption policy that was equivalent to a speedy liquidation of the ITC. Rather it lay in the greater "flexibility" that managers "felt" they would have in correcting what they considered to be short-term "discount anomalies". Presumably the use of this additional flexibility would involve both share redemption when discount levels were considered wide and share re-issuing when discount levels were considered narrow. We return in later chapters to consider the discount and the validity of many of the arguments surrounding this controversial statistic. However for the present we note that the division in the ITC movement over this issue broadly followed the division between those managers who consider the discount as important and those who do not.

In response to arguments favouring some relaxation of the restrictions surrounding share capital reductions the 1981 Act proposed a major change in the then existing share capital provisions.¹⁵ The changes are complex and to the best of our knowledge have not as yet been fully

15. Companies Act 1981, Part III S(36) to 62.

tried in practice. The main characteristics of the new proposals that are of most relevance to our purpose are as follows :

1. Purchase by a company of its own shares is now permitted.
2. Shares may only be purchased out of either distributable reserves or the proceeds of a new issue made specifically for that purpose.
3. Shares purchased by the company are considered as cancelled.

While these provisions effectively meet the "mature industry" arguments supporting capital reductions they do not in practice provide ITC managers with any "additional flexibility" over share capital. There are two reasons for this. First of all the Act clearly states that purchases can only be made out of distributable reserves. We noted above that an ITC's distributable reserves are restricted to its revenue reserves. We also noted that the Taxes Act and the 1980 Act insist on a high pay-out ratio from distributable profits. Indeed both Acts require at least 85% of net revenue to be distributed. Any decision to redeem share capital will in all probability then require a substantial dividend reduction. The possibility of obtaining relief from the capital dividend restrictions of the 1980 Act and the Taxes Act was explored by the movement. However the Inland Revenue made it clear that no exemptions would be available. In addition they pointed out two effects that would follow on from an ITC using its capital reserves to purchase equity. First of all the ITC would lose its privileged tax status in relation to capital gains tax. Secondly as the purchase provisions of the 1981 Act only applied to distributable reserves any use of capital reserves would be considered as a normal dividend distribution on which advanced corporation tax would be due and which would also expose ITC equity holders to

potential higher rate and investment surcharge liabilities. These tax implications for the ITC shareholder would represent a real cost over the alternative of a share redemption scheme within the terms of the 1981 Act. A share redemption scheme within the terms of the 1981 act would be considered as capital transactions for tax purposes the potential tax liabilities would be zero for ITCs and limited to 30% of any chargeable gain for ITC equity holders. Given the restriction on applying capital reserves to a share redemption scheme together with the effects of ignoring the restrictions then the usefulness of the 1981 Act to ITC managers turns very much on their willingness to fund capital redemptions through dividend reductions. While there is some support for capital redemption schemes in general within the ITC movement there is very little support for such schemes unless they can be funded from capital reserves. ITC managers would certainly consider the balance of advantage to be on the side of maintaining dividend levels.

The second aspect of the 1981 Act that restricts its potential usefulness to ITC managers concerns the provision that redeemed equity is considered cancelled. We note above that the "flexibility" that ITC managers wanted over share capital was a "flexibility" that allowed for both redemption and re-issue. Clearly there is no place for re-issuing redeemed equity in the "mature industry" arguments that support the 1981 Act.

While the 1981 Act may well prove a helpful statute for companies in the industrial and commercial sectors the restrictions noted above will in practice limit its applicability for ITCs.

We conclude this section by noting that in addition to these statute imposed parameters ITCs must also follow the various stock exchange listing regulations and annual disclosure rules.¹⁶ These rules and regulations are similar in spirit to the tax and statutory requirements. For example they insist on among other things that only revenue distributions be allowed and that managers maintain diversified portfolios which are dominated by quoted securities. It is interesting to note that the U.S. OTC market is considered for stock exchange purposes as "listed".

Regulations whether statutory or otherwise have always been very much a part of the ITC movement. This is largely due to the knowledge that ITCs are the delegated recipients of investors' savings. The rules help to ensure that managers are prudent and fully appreciate the fiduciary nature, although not requirement, of their actions. However we note a perhaps revealing comment by Robert Fleming to Calvin Bullock in 1924 on the setting up by the latter of the Nation-Wide Securities Company

"Don't tie yourself with too many restrictions. Restrictions you put on today that you think are for the protection of your shareholders, will rise up someday to plague you." 17

16. Stock Exchange, "Admission of Securities to Listing", Chapter 9.

17. H. Bullock, "The Story of Investment Companies", New York, 1959, p.24.

2. Taxation : As incorporated companies ITCs are subject to the usual assessment rules governing the computation of taxable receipts. These rules are revised periodically through the various Finance Acts which set out the Government's budgetary strategy. In addition occasional codifications are introduced as specific tax statutes.¹⁸ It is not our purpose to provide a detailed chronology of the tax developments over the decade. Rather it is to deal with the general principles of tax as they relate to ITCs. However it should be noted that the decade has witnessed some major changes in taxation. For example the Finance Act 1972 introduced a fundamentally new form of corporation tax. Similarly with more specific reference to the taxation of ITCs there was a gradual reduction in the liability of ITCs to corporation tax on capital gains throughout the decade culminating in the eventual removal of ITCs from the scope of this aspect of corporation tax.

There are several philosophies underpinning U.K. taxation and two are of particular relevance to our purpose. The first is a distinction between taxable capital transactions and taxable income receipts and the second is that within the broad definition of income receipts the relevant tax rules are determined by the income source from which the receipt arises. This latter aspect of the U.K. tax system is becoming increasingly controversial following the widespread publicity given to the various forms of expenditure orientated tax advocated by the Meade Report.¹⁹

18. Perhaps the most important recent codification is found in the Income and Taxes Act 1970.

19. J. E. Meade, "The Structure and Reform of Direct Taxation", Institute for Fiscal Studies, 1978.

While ITCs are subject to the same rules as other incorporated companies the sources of taxable receipts differ significantly. Manufacturing and commercial companies have relatively few taxable capital transactions and the bulk of any tax liability centres on the tax due on trading profits. On the other hand for the majority of the 1970s ITCs incurred liabilities following the profitable realizations of portfolio securities. In addition ITCs have few if any income receipts liable to trading profits tax. The bulk of their taxable income receipts are sourced from unfranked and uncovered investment income.

In this section we have three objectives. First of all we describe the basic elements involved in the taxation of ITCs. Secondly as ITCs are financial intermediaries providing a delegated management function it is important to appreciate not only the tax rules governing ITC tax computations themselves but also how the various rules interact with the computation of shareholder tax liabilities. After all if significant tax penalties are involved in using ITC intermediation services then their potential attractions will be considerably reduced. Finally as ITCs are one of several methods by which investors can obtain stockmarket exposure we assess the relative efficiency of the ITC vehicle. To deal with these four areas we adopt the following approach.

- (i) The Taxation of ITCs.
- (ii) The Tax Effects of Holding ITC Equity.
- (iii) The Relative Tax Efficiency of ITCs.

- (i) The Taxation of ITCs : ITCs are liable to corporation tax on certain income receipts. Throughout the 1970s this liability was extended to net gains on portfolio transactions. Both forms of receipt will consist of elements sourced from U.K. and non-U.K. investments. As the vast majority of ITCs are U.K. incorporated and managed companies all income and gains must initially be brought into computational consideration. We noted above that U.K. taxation involves a distinction between income and capital receipts. We follow this distinction dealing first with the former source. Exhibit 2(ii) shows a typical pro-forma tax computation for an ITC without any taxable gains.

The three sources of income shown on the left-hand side of Exhibit 2(ii) include all the main credits to be found on the income statements of most ITCs. Franked investment income (FII) defines distributions paid out of U.K. taxed profits.²⁰ The most important receipts within this source are U.K. corporate dividends. Unfranked income (UFI) describes receipts paid out of profits prior to tax. In other words a corporate payer is allowed tax relief on these disbursements. The most important receipts within this source are interest receipts from loan stock and debentures. However also included in this caption are the interest receipts from government securities. The third category of income namely overseas income includes all foreign income irrespective of whether it has

20. Franked investment income or franked payments (FP) are technically the sum of the cash distribution and the related tax credit.

been paid out of profits either before or after they have suffered tax.

All three sources of income will be received by an ITC under some form of tax adjustment. U.K. dividends are accompanied by a tax credit which represents an additional amount paid by the dividend payer to the Inland Revenue and is equivalent to the basic rate of tax on the gross dividend paid. To the dividend payer this additional disbursement is considered as a first or advance payment of corporation tax (ACT). The recipient ITC must add the tax credit to the dividend received in order to record the full amount of the FII. UFI is usually paid under deduction of basic rate income tax which is then passed on to the Inland Revenue.²¹ As with FII the computational accounting to record UFI receipts is to add back the income tax deducted. A similar procedure is adopted to account for any overseas income which has been subject to a foreign withholding tax. Since 1965 no relief has been available on any underlying foreign tax such as foreign corporation tax unless the foreign payer is a "related" company.²² However the grossing-up procedure for a U.K. tax computation excludes the adding back of any underlying foreign tax suffered by a non-related company. Therefore while no relief is given it is not in fact required in the sense that only the net distribution before withholding tax is taxable in the U.K.

Having determined the gross receipts from the various income sources the taxable amounts can then be computed. FII is not subject

21. Deposit interest and a small number of government securities pay interest gross.

22. In order for the foreign company to be considered as "related" the U.K. company must control 10% of its voting power.

to U.K. corporation tax. Thus to the extent that an ITC makes distributions dividends received flow through the intermediation vehicle without suffering any tax. The situation is more complex if FII does not exactly equal FPs. If FII is greater than FPs a refund is available from the Inland Revenue. However any refund is restricted in two ways. Firstly it is limited to any ACT amounts already paid within the same accounting year. Secondly any surplus FII at the end of the year is carried forward rather than repaid. On the other hand if FPs exceed FII ACT will be payable by the ITC. In our example the ACT amounted to $\frac{3}{7}$ of £7 or approximately £3. This ACT subject to certain restrictions can be used to reduce any mainstream liability.²³ The accounting for ACT to the Inland Revenue is completed quarterly with any payment or refund being made within a few days following the end of the accounting quarter.

Unlike FII UFI and overseas income are liable to corporation tax. However the gross amount from these two income sources can be reduced by operating expenses including any debt servicing costs. In addition a credit equal to the foreign withholding tax suffered is available against the U.K. tax on the relevant overseas income.

We noted above that unfranked payments are made subject to an income tax deduction. The majority of ITCs have both UFI and unfranked disbursements. A similar method of quarterly accounting to that for ACT deals with any income tax payments due on interest payments made. Unfortunately if UFI exceeds unfranked payments the income tax suffered must first be deducted from any mainstream corporation

23. To the extent that the available ACT set-off is restricted in any one year it may be carried forward indefinitely.

tax liability before the excess is refunded by the Inland Revenue.

We have now dealt with the basic aspects of taxing an ITC's income receipts. However before moving on to describe the computation of capital gains liabilities it should be noted that the amount of tax actually payable by the ITC is not necessarily the same as the total tax liability suffered by the ITC. In our example £5 of mainstream corporation tax would have to be paid by the ITC. The balance of the total tax liability is made up of the foreign tax and ACT. The latter is split between that paid by the corporate source of the ITC's dividend income and the excess of the ITC's FPs over its FII.

In terms of the tax cost directly identified with the ITC intermediation function the total cost will be made up of mainstream liability plus any unrelieved foreign withholding tax. Underlying foreign tax while representing a cost is not one specific to ITCs. Indeed relief from underlying tax is only available in the "related" company example noted above.

We noted in the previous section that ITCs have historically kept their capital transactions separate from the returns available for equity distribution and that this division usually enshrined in the Articles of Association is now established by statute. As a result of this capital gains and losses are considered balance sheet transactions accounted for through a capital reserve account and thus having no direct effect on ITC income statements. Similarly any tax due on these capital transactions is debited to the balance sheet capital reserve account. The tax implication of both separating capital and

revenue transactions and of limiting ITCs distribution to revenue items is particularly important. Indeed if the Inland Revenue considered portfolio trading to be at such a level that the ITC was effectively a dealing company then it is quite possible that any gains would be treated as revenue items and liable to the full rate of corporation tax which as we note below is higher than the effective rate of corporation tax on gain.

Between 1965 and 1980 corporation tax was charged on the net gains resulting from ITC portfolio transactions. The effective rate of tax was initially 30% but this was reduced in 1972 to an amount equivalent to half the basic rate of income tax. A further reduction to 10% after April 1 1977 was followed by the removal of ITC portfolio transaction from the scope of this tax after April 1 1980.²⁴ It should be noted that although we quote the effective rates of gains tax technically the gains were liable to the full rate of corporation tax. However the legislation specifically exempted a portion of corporate gains from tax. With a corporation tax rate of 52% and a capital gains tax rate of 30% only $\frac{15}{26}$ of the chargeable gains were liable to corporation tax. By bringing gains into the scope of corporation tax it allowed them to be treated in much the same way as UFI. In particular they were available to cover management and interest expenses.²⁵

There is little doubt that the taxation of gains represented a potential cost to ITC portfolios. In addition the computational

24. Strictly these reduced rates only apply to Inland Revenue "Approved" ITCs. We deal with approval in the next sub-section. However we note in passing that if no approval is obtained the gains are liable to the full 30% effective tax rate.

25. Realized losses were offsettable against realized gains and if still uncovered could be carried forward.

aspects of the tax were extremely complex especially in the earlier years when various rules were required to avoid taxing the pre-1965 element of any realized gains. The fact that tax was only charged on realized gains rather than valuation gains provided some relief. Unfortunately this was to a large extent offset by the tax being charged on actual gains rather than inflation-adjusted gains. One particular point of contention with the gains tax legislation was that while gains on foreign transactions were taxable losses on exchange fluctuations were not allowable. Given these costs and complexities it is no surprise that the post April 1 1980 exemption from gains tax was welcomed by the sector.

Having described the main computational aspect of ITC tax assessment one or two further points are required on ITC tax management. The most important point concerns the interaction between the various taxable elements of the computation. Exhibit 2(iii) highlights these elements.

From Exhibit 2(iii) it is clear that by using foreign tax credits and expenses ITC managers can remove any potential liability to U.K. corporation tax. There are several elements of tax law that allow this possibility to arise. First of all the ITC can choose the order of expense set-off. In our example the liability on gains was removed first followed by that on UFI with the balance going against overseas income. The corporation tax then due on the overseas income was exactly equal to the foreign tax credit. As surplus foreign tax credits can neither be carried forward, refunded, or as we noted above offset against the U.K. tax on non-overseas income it is prudent planning to follow the offsetting priorities

EXHIBIT 2(iii)

<u>Investment Trust Companies</u>					
<u>Tax Management</u>					
	FII	UFI	Overseas	Gains	Total
U.K. Dividends					
Interest Received					
Foreign Income					
Chargeable Gains					
	7455	1000	1386	-	9930
Expenses & Interest		<1000>	< 986>		<1986>
	<u>7455</u>	<u>-</u>	<u>400</u>	<u>-</u>	<u>7944</u>
Corporation Tax (52%)			208		208
Foreign Credit (15%)			208		208
Foreign Tax (15%)			208		208
UK Tax Credit	2263				2263
	<u>2263</u>	<u>-</u>	<u>208</u>	<u>-</u>	<u>2471</u>
Available for Dividend	5281		192		5473
<u>Cash Dividend Paid</u> - < 5281			<u>Cash Dividend Paid</u> -> 5281		
1. Dividend short-fall can be made up in future years			1. ACT will reduce corporation tax charge.		
			2. Unrelieved foreign tax credit will be reduced and perhaps lost as ACT must be deducted first.		

adopted in our example.²⁶ Finally we noted earlier that any surplus ACT could be used to reduce the mainstream liability. However as ACT must be offset before any foreign tax credits there is the danger that too high a pay-out policy would also result in the foreign credits being lost.

ITC tax management therefore involves the maintenance of a fine balance. Too high a liability to corporation tax will represent a real cost to the ITC. However reducing taxable income in relation to expenses may also lead to a real cost in terms of lost foreign tax credits and delay in utilising operating expenses. The management of tax exposure is of course only one of the investment variables that ITC management must deal with. It may well be that some tax intermediation expense must necessarily be incurred in order that management can follow its chosen portfolio strategy. For example we noted in chapter 1 that some ITCs attempt to minimise the effect of an anticipated bear market by taking positions in short-term government securities. Such a move will tend to raise UFI and thus increase potential tax exposure. A switch into foreign securities would have a similar effect. The importance of tax planning varies considerably from ITC to ITC. Table 2(i) shows the tax intermediation costs for forty ITCs as reported in their 1979 annual accounts. The bulk of the cost comes from U.K. mainstream corporation and in fact most ITCs appear to be reasonably successful in fully relieving foreign withholding tax.

It is clear from Table 2(i) that ITCs incur substantial intermediation tax costs. The average charge against gross revenue is approximately

26. Unlike foreign tax credits surplus expenses can be carried forward.

TABLE 2(i)

Investment Trust Companies					
Tax Intermediation Costs					
1979					
Trust	A	B	Trust	A	B
Alliance Investment	5	1.0	Globe	5	0.2
American Trust	14	0.3	Investing in Success	-	0.8
Anglo Scottish	3	0.3	Investors' Capital	15	0.4
Ashdown	8	0.5	Keystone	10	0.4
Atlantic Assets	-	1.5	Lakeview	6	0.1
Border & Southern	7	0.2	Monks	8	0.5
Broadstone	9	0.5	Murray Caledonian	7	0.7
Brunner	-	0.7	Murray Western	13	0.2
Capital & National	7	0.9	Outwich	-	0.2
Cardinal	7	0.2	Pentland	2	0.1
Charter Trust	10	0.2	RIT	8	-
Continental & Industrial	5	0.2	St. Andrews	1	0.1
Edinburgh Investment	10	0.5	Scottish Investment	9	0.1
English & Scottish	5	0.6	Scottish United	12	0.4
First Scottish American	1	-	Second Alliance	6	0.6
Foreign & Colonial	5	0.2	Sterling	11	0.6
General Consolidated	5	0.2	Tribune	3	-
General Funds	0	0.2	US and General	18	0.3
General Investors	4	0.5	US Debenture	7	0.2
General Scottish	10	0.5	Witan	2	0.4

Notes:

1. Source : Annual Accounts

2. Code : A - Mainstream Corporation Tax (excluding gains) plus unrelieved foreign tax as a percentage of gross revenue.

B - Corporation tax on gains as a percentage of gross assets.

7% which is slightly greater than the average gross management expense charge of 6% noted in chapter 1. The importance of gains tax liabilities is small in terms of portfolio size. The average charge against gross assets is less than $\frac{1}{2}\%$. Indeed given the various reliefs available to tax paying shareholders which we describe below the intermediation costs of gains tax to tax paying shareholders can in fact be reduced to zero.

Returning to the intermediation expense of revenue tax it is extremely difficult to completely explain both the variation between ITCs and the high average exposure to this expense. Undoubtedly the investment strategy reasons noted before will be relevant. However even allowing for this it is difficult to escape from a conclusion that would not include elements of inefficient tax planning as an explanatory variable.

- (ii) The Tax Effects of Holding ITC Equity : An interest in an ITC can be obtained as we noted in chapter 1 through the purchase of ordinary equity, debt, preference shares, convertibles, B shares or warrants. By far the most important participation instrument is the ordinary equity share and it is on the tax effects of holding this instrument that we concentrate. However at a later stage in this sub-section we briefly mention the relevant tax implications of holding these other instruments.

The precise tax status of each ITC equity holder whether institutional or individual is of course unique. However it is possible to indicate the general effects of holding ITC shares without recourse to the tax elements specific to each holder. Very simply we can consider the effect of holding ITC shares from the point of view of two extremes - taxpayers and non-taxpayers. This latter category may appear somewhat

unrealistic. However many institutions and in particular pension funds are gross funds whose receipts are not liable to tax.

Those investors liable to gains tax on their asset transactions have suffered this tax since 1965. The legislation is not retrospective and hence in computing the chargeable gain only the post April 1965 gain is brought into charge. There exist complex rules of computation both for assessing the gain on different types of asset and for allocating the pre and post 1965 elements.²⁷

We noted above that the basic rate of capital gains tax is 30% of the chargeable gain for both individuals and corporate payers. There are several reliefs on small disposals which are of particular interest to individuals. While the 30% tax rate has remained the same since 1965 the monetary value of these reliefs on small disposals has in general increased. In part this has been necessary in order to limit the number of assessable transactions. This is considered desirable in view of the administrative expense involved in applying a complex tax to small transactions.

As a chargeable asset the profitable sale of an ITC security will lead to a gains tax liability in the hands of an investor. To the extent that the ITC has already paid corporation tax on its realised portfolio gains this clearly involves a significant element of double taxation. In order to provide relief against this double taxation a system of tax credits was initially available to investors. Following the exemption of ITCs from gains taxation on portfolio realisations after April 1 1980 the credit system was removed. Since then investors have been liable to the full rates of gains tax on their ITC disposals

27. For example in computing the chargeable gain on a security rights issues, bonus issues and take-overs represent complex sources of adjustments.

as no elements of double taxation are now involved.

The reduced rates of tax on ITC portfolio gains which were noted earlier together with the system of credits available to ITC shareholders and the exemption of ITC portfolio gains from tax after April 1 1980 are only applicable to Inland Revenue "Approved" ITCs. Approval which must be sought each year is conditional on ITCs meeting various statutory requirements. These requirements are set out in S(359) of the Taxes Act 1970 and are as follows :

"S(359) -

(1) For the purposes of this Chapter 'investment trust' means, as respects any accounting period, a company which is not a close company and which is approved for the purposes of this section for that accounting period by the Board, and the Board shall not approve any company unless it is shown to their satisfaction:-

- (aa) that the company is resident in the United Kingdom, and
- (a) that the company's income is derived wholly or mainly from shares or securities, and
- (b) subject to subsection (2) of this section, that no holding in a company, other than an investment trust or a company which would qualify as more than 15 per cent by value of the investing company's investments (but see Note below), and
- (c) that the shares making up the company's ordinary share capital (or, if there are such shares of more than one class, those of each class) are quoted on a recognised stock exchange in the United Kingdom, and
- (d) that the distribution as dividend of surpluses arising from the realisation of investments is prohibited by the company's memorandum or articles of association, and
- (e) that the company does not retain in respect of any accounting period more than 15 per cent of the income it derives from shares and securities"

Note: "For the purposes of paragraph (b) of Section 359(1) and the other provisions having effect in relation thereto :-

(i) holdings in companies which are members of a group (whether or not including the investing company) and are not excluded from that paragraph shall be treated as holdings in a single company.

(ii) where the investing company is a member of a group, money owned to it by another member of the group shall be treated as a security of the latter held by the investing company and accordingly as, or as part of, the holding of the investing company in the company owning the money, and for the purposes of this paragraph 'group' means a company and all companies which are its 51* per cent subsidiaries."

* S.93(6) (b) F.A. 1972.

"(2) Subsection (1) (b) above shall not apply -

- (a) to a holding in a company acquired before 6th April, 1965 which on that date represented not more than 25 per cent by value of the investing company's investments, or
- (b) to a holding in a company which, when it was acquired, represented not more than 15 per cent by value of the investing company's investments,

so long as no addition is made to the holding.

"3) For the purposes of subsection (2) above -

- (a) 'holding' means the shares or securities (whether of one class or more than one class) held in any one company, and,
- (b) an addition is made to a holding whenever the investing company acquires shares or securities of that one company, otherwise than by being allotted shares or securities without becoming liable to give any consideration, and if an addition is made to a holding that holding is acquired when the addition, or the latest addition, is made to the holding, and
- (c) where in connection with a scheme of reconstruction or amalgamation, a company issues shares or securities to persons holding shares or securities in a second company in respect of and in proportion to (or as nearly as may be in proportion to) their holdings in the second company without those persons becoming liable to give any consideration, a holding of the shares or securities in the second company and a corresponding holding of the shares or securities so issued shall be regarded as the same holding."

These rules effectively put three restrictions on an ITC in order that it can achieve the "Approved" status. Firstly income must come "wholly or mainly" from shares or securities. In practice "wholly or mainly" is taken by the Inland Revenue as 70%. Secondly no more than 15% of the ITC's portfolio may be invested in one holding. This

restriction does not apply to holdings in gilts, investments in other ITCs and unit trusts or holdings acquired before April 1965 if at that date these holdings were equivalent to no more than 25% of the ITC portfolio. Perhaps more importantly this restriction is only applicable at the time of acquisition. Finally 85% of the net income of each accounting year must be distributed. Net income excludes any realised gains.

These restrictions do not in practice limit the scope of most ITCs. For example we noted previously that diversification, high dividend pay-outs and investment strategies orientated to securities together form a large part of the historical role played by ITCs. On the other hand the benefits of approval in terms of reducing the gains tax intermediation cost of using the ITC vehicle are considerable. Indeed to tax paying investors this aspect intermediation cost was effectively eliminated.

The system of credits available to ITC shareholders was in itself fairly complex. The broad outlines are shown in Exhibit 2(iv).

EXHIBIT 2(iv)

<u>Investment Trusts</u> <u>Capital Gains Tax Credits</u>		
Date	ITCs	ITC Shareholders
1965 - 1972	30% of Taxable Gains	Net portfolio gains attributable to stockholding were added to the cost of the ITC equity.
1972 - (i) 1977	$\frac{1}{2}$ the basic rate of income tax	-
(ii) 1979	-	$\frac{1}{2}$ the basic rate of income tax allowed as a credit against gains on ITC equity disposals but restricted to ensure the credit did not exceed a shareholder's actual taxable gains.
1977 - 1980	10% on net gains	-
1979 - 1980	-	10% on net gains subject to similar restriction as above.

Several points should be noted from Exhibit 2(iv). First of all the credit system up until April 1972 although cumbersome in terms of the records and computations required did have the advantage of accuracy in the sense that it provided a direct link between the portfolio liability and the shareholder credit. In general however the post April 1972 system while somewhat "rough and ready" was easier to administer and to this extent was considered superior. Secondly the lag in reducing the shareholder credit to 10% was to avoid shareholders losing a substantial credit "overnight" on ITC securities they had purchased prior to April 1977. The April 1980 change did not require a similar transition period as it was announced a year in advance. Finally the rules of credit computation were to ensure that any credit available was restricted to any gains tax actually payable by the investor. In other words the credit was neither refundable nor available for carry forward.

While these reliefs removed any tax intermediation costs related to portfolio gains for tax paying shareholders the position was very different for non-tax paying shareholders. This latter status could arise through tax allowances in the case of individuals or statutory exemption in the case of for example gross pension funds. To those investors who had no tax liabilities against which to offset the shareholder credit any corporation tax on ITC portfolio gains represented a real tax intermediation cost. With the removal of portfolio gains from the scope of taxation in April 1980 non-taxpayers are now in the same position as tax payers in that they suffer no intermediation gains tax costs through using the ITC intermediation vehicle.

Taxpayers who receive dividend distributions from ITCs are required to gross up the cash dividend by the related tax credits. Corporate

taxpayers like ITCs themselves do not pay tax on this franked income. Individuals are however liable to income tax at either the basic or higher rates. In addition individuals may also incur a liability to the investment income surcharge if they receive sufficient unearned income. The tax credit deducted by the payer ITC can be offset against these income tax liabilities. This distinction between individual and corporate ITC equity holders is not particularly important as any ITC dividend received by a dividend paying corporate holder may well end up in the hands of an individual investor where it is treated in the same way as the ITC dividend received direct. Non-taxpayers who receive dividend distributions from ITCs also receive them net of the tax credit. This credit can usually be claimed back from the Inland Revenue. The availability of a tax credit refund effectively puts non taxpayers in the same position as taxpayers who we noted above either don't pay tax on franked income or can offset the tax credit against any income tax or investment income surcharge liabilities.

However while the mere receipt of a dividend distribution incurs neither an intermediation cost nor differentiates between taxpayers and non taxpayers it must be remembered that these franked distributions have been paid out of income streams which as we noted in Exhibit (ii) have been charged to intermediation tax. This tax made up of mainstream corporation tax and unrelieved foreign withholding tax represents a real intermediation cost that can't be relieved by ITC shareholders. Indeed the presence of this cost, its size and the potential we noted above for minimising its effect are perhaps the most important points to stress with regard to the taxation of ITCs.

In concluding this sub-section we turn to the main tax effects that

result from holding the other ITC participation instruments.

The credit systems available to offset the double taxation of portfolio gains were only available against securities which on a liquidation of the ITC would secure the whole or a substantial part of the net assets. The credits were therefore not available on preference shares, warrants, convertible stocks of B shares. However when ordinary equity was obtained through either the exercise of a warrant or on the conversion of B stocks or convertible stocks the resulting ordinary shares did qualify for a tax credit calculated from the date of the initial instruments' purchase.

Perhaps the most interesting of these other instruments from a tax viewpoint are B shares. To the taxpayer who suffers high rates of income tax the possibility of receiving an investment return in terms of capital gain rather than the higher taxed dividends is attractive. B shares until the Finance Act (2) 1975 provided such an investment vehicle. These instruments offer either a very small cash dividend or no dividend at all. Instead holders receive a scrip issue of B shares equivalent to a cash dividend together with an annual option to convert the B shares into ordinary equity. The high taxpayer could obtain income by selling the B shares. Any tax liability was restricted to capital gains tax which at 30% was considerably lower than the higher rates of income tax. Unfortunately the 1975 Act provided that such scrip issues would be considered as cash dividends with tax including investment income surcharge being assessed on the dividend received grossed up by a notional tax credit. While this notional credit was available to reduce any assessed tax it was not available as a tax refund. This change in the law removed all the tax advantages associated with B shares

and indeed as we noted in chapter 1 they are now considered as having little investment merit.

- (iii) The Relative Tax Efficiency of ITCs : Individuals wanting to gain stock market exposure have a wide range of alternative intermediaries available to them. They may of course decide to forego intermediation and invest directly in the stock market. In this section we briefly compare the relative tax efficiency of using an ITC intermediation vehicle with that of either direct investment or investment through one of three other investment intermediaries namely pension funds, unit trusts or life assurance.

Direct investment in the stock exchange by an individual can of course only be undertaken from post-tax income. In addition any returns received may be subject to capital gains tax, income tax and perhaps investment surcharge. This position is identical to that of using an ITC. However direct investors will have no relief against any underlying corporation tax on the gains suffered by the constituent companies in their portfolios. Similarly given that most investment strategies will involve both some expense and some exposure to a tax liability then accumulating the expenses within an ITC may provide some relief in that expenses incurred managing a private portfolio would not be tax deductible. However as we noted earlier ITCs in practice incur tax intermediation costs in excess of those required to cover operating expenses. Therefore unless there are over-riding investment reasons justifying this tax exposure any potential tax advantage ITCs may have over direct investment may well be lost.

Pension funds offer a significantly more tax efficient savings medium than ITCs. This conclusion holds for both occupational schemes and the retirement annuity schemes designed for those not in pensionable employment. Within certain restrictions contributions to both types of scheme can be paid out of gross income.²⁸ The purchase of ITC shares however can only be made out of taxed income. Similarly the pension funds themselves are effectively exempt from U.K. tax on gains and income receipts. This exemption ensures that no tax intermediation costs are incurred. Finally the beneficiaries of pension schemes receive their returns in terms of earned income rather than the potentially higher taxed unearned income which ITC holders may suffer. As we have noted several times these benefits in terms of tax efficiency have led to a significant increase in the popularity of saving through pension related schemes. The current tax legislation is undoubtedly of major benefit to the pensions industry and a point of competitive disadvantage to ITCs.

The taxation of unit trusts is broadly the same as that for ITCs. Indeed neither intermediation vehicle possesses significant advantages of tax efficiency over the other. This similarity of tax treatment extends to revenue receipts, portfolio realizations, operating expenses, foreign earnings and to the relief against the double taxation of portfolio gains. Undoubtedly unit trusts benefit considerably from being treated almost "as if" they were incorporated ITCs. In particular if they were treated strictly as fiduciary trusts management expenses would be considered as an annual charge deductible only after the trust income had been assessed to income tax. While unit trusts themselves possess no significant tax

28. Untaxed contributions to a retirement annuity scheme are limited to 17½% of "net relevant income" which is very broadly equivalent to earned income. Similar contributions to an occupational scheme are limited to 15% of the employees income. However employers' contributions are also a tax deductible business expense.

advantages over ITCs the fact that they are not treated as fiduciary trusts certainly removes any potential tax advantage allowed to ITCs through incorporation.

There are many different types of life assurance policy available. They range from simple term policies which pay an assured sum on death if within a certain specified period to the more complex endowment policies which pay on the earlier of death or maturity and which in addition contain significant elements of investment as well as insurance. Within this latter category two types of policy stand out as potential rivals to ITCs. They are unit-linked policies and with profits endowment policies. Under a with profits endowment policy the insurance company assures a minimum sum to the policy holder plus a bonus element based on the profits of the insurance company. The bonuses can either be added to the sum assured during the life of the policy or paid as a terminal bonus. The profits of the insurance company and therefore the size of the available bonuses will depend upon the returns the company earns from investing the premium income received from the policy holders. It is therefore very much operating as an investment intermediary. Unit linked policies are perhaps even more geared to investment than with profit endowment policies. Under a unit-linked scheme the life insurance policy payable on the earlier death or maturity is linked to an underlying investment fund set aside by the insurance company. This fund is divided into "units" and allocated to policy holders based on the amount of their premium payments. The amount payable to a policy holder over and above the guaranteed minimum is dependent on the value of these units at the time the policy falls due. Therefore like the with profits endowment policy the value of a unit linked scheme to a policy holder very much depends on the investment

skill of the managers operating the fund. Within each of these two broad categories of policy there is a considerable range of potential investment exposure. For example a policy with a small sum assured in relation to the premium paid is quite obviously a policy written predominantly for an investor rather than an individual seeking life insurance. In managing the underlying funds insurance company managers have considerable investment discretion subject to meeting their fixed policy liabilities. Interestingly the Insurance Company Regulations now restrict unit-linked funds to investments in listed equities, unit trusts, gilts and various forms of deposits. Such restrictions tend to remind the insurance sector that the tax benefits which we describe below are primarily to assist life insurance rather than the promotion of an investment vehicle.

The tax implications for holders of life insurance policies depend on whether the premiums are payable at regular intervals or in a lump sum.

Regular premiums on "Qualifying Policies" attract a tax relief for the policyholder equivalent to half the basic rate of income tax times the premium paid.²⁹ In order to qualify a policy must meet certain conditions. For example there must be regular (at least annual) premium payments and the policy must be capable of lasting at least ten years. While this premium relief is clearly less than that available to pension fund contributors no such relief is available to assist purchasers of ITC equities.

When the policy falls due the total benefits are exempt from both

29. The tax relief available is restricted. In 1980/81 it is limited to one sixth of taxable income (after charges) with an overall maximum of £1500.

capital gains tax and income³⁰ tax. Again these represent substantial tax benefits for policy holders as compared to ITC equity holders who usually suffer tax on their investment returns.

Single premium policies are virtually all unit-linked. Unlike the regular premiums on "Qualifying Policies" the single premium does not attract tax relief. During the life of the policy there are no tax implications for the holder. However unlike the regular premium policies the maturity of the single premium policy may be a taxable event for the policy holder. This will crucially depend on the policy holders taxable income in the year the policy matures. The computational procedure is as follows.

The "profit" on the policy is calculated by subtracting the premium paid from the surrender value of the policy. The profit is then divided by the number of years the policy was held for. The resulting "slice" is then added on to the taxpayer's total taxable income for the year and if this additional income shifts the taxpayer into either higher rate or investment income surcharge tax brackets then that rate of tax net of the basic rate is applied to the policy profit. For example if the profit on a policy maturing after five years was £1000 and this shifted the taxpayer into the 45% higher rate and the 15% investment income surcharge bracket the tax payable assuming a basic rate of income tax of 30% would be :

$$(.45 + .15 - .30) (1000) = £300.$$

30. Tax legislation provides that the tax benefits of life assurance policies are only available to the original beneficial policy holder or the spouse.

Clearly no tax would be payable if the profit on the policy did not take the taxpayer into the scope of either higher rate or investment surcharge.

In spite of this potential tax liability when the single premium policy matures the reduced rates of tax and the delay in tax payment until the policy matures do represent significant elements of tax efficiency over the use of the ITC intermediation vehicle.

The taxation of insurance companies as distinct from their policy holders is significantly different from that of the other intermediaries we have considered. Capital gains are taxed at the full 30% rate. UFI less operating expenses is taxed at 37.5% and FII received under deduction of the tax credit is effectively taxed at the basic rate of income tax as the tax credits cannot be reclaimed by the insurance company. There is then the potential for insurance companies to incur substantial tax intermediation costs. Even allowing for the effective taxation of FII and capital gains it is usually considered that the contribution and settlement benefits described above imply insurance based intermediation is a more tax efficient route to the stock market than an ITC. This view is supported by the comment of the Wilson Committee detailed in chapter 1 on the reasons for the institutionalisation of the stock exchange. They suggested that the relative tax efficiency of pension funds and life assurance policies over other investment approaches was a key variable promoting institutionalisation.

Before leaving the area of relative tax efficiency one further point should be noted. The securities of listed companies and unit trusts are fairly easily marketed through the stock exchange. The realised

proceeds suffer transaction costs and of course any gains may be liable to capital gains tax. The rights that accrue to the holders of pension contracts and life assurance policies are not as easily encashed. Indeed substantial management expenses are often incurred on early cancellation. In addition there may well be tax implications following a cancellation. For example the surrender of a full endowment policy within the 10 year minimum period may involve the drawback of premium relief and the taxation of the policy profit at higher and surcharge rates. Single premium policies usually allow for partial cancellation during the life of the policy and these will not attract tax penalties unless more than 5% of the proceeds are withdrawn in any one year.

In concluding this sub-section it is reasonably clear that ITCs tend to be less tax efficient than pension or insurance funds and potentially more tax efficient than a strategy of direct stock exchange investment. Unit trusts we noted are taxed in the same way as ITCs.

3. Market Environment : The London Stock Exchange provides a market environment in which ITC equity can be exchanged for new capital and thereafter continuously traded. In chapter 1 we described the various equity instruments outstanding and the experience of the sector in the primary market during the nineteen seventies. Our objective in this chapter is to examine the secondary market.

The principle function of secondary trading is to allow the development of a continuous market for securities. It thus provides investors with liquidity. In doing so the jobbers strike prices which equate demand and supply for any particular security. However the importance of the striking price is far greater than the mere closing of a deal.

It provides a means of valuing a company which in turn implies the return required by investors for any project undertaken by their company. As the required rate of return bears directly on the demand for investment funds the stock exchange is essentially providing an allocation mechanism for the resources in any economy.

Given this importance of the stock exchange as an allocative mechanism it is vital that it provides prices that accurately represent the market consensus. The ideal conditions for this are well known and underpin much of micro-economic price theory.³¹ While it is of course not necessary for theoretical assumptions to be perfectly reflected in reality it is clear that the successful operation of the stock exchange in correctly allocating resources does hinge on certain conditions being reasonably fulfilled.³² In particular we would expect any market process to react quickly and accurately to information about either an individual security or indeed the general economic environment. To the extent of any delay or inaccuracy in assimilating information the market will be producing erroneous price signals and can be considered as being inefficient.

Empirical research on assessing the efficiency of stock markets occupies a significant and non-trivial proportion of research in finance. Work in this area comes under the general heading of tests of the Efficient Markets Hypothesis (EMH). An efficient market is described for this purpose as a market where

"... security prices at any time fully reflect all available information."³³

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- 31. P. Samuelson, *Economics* (McGraw-Hill Kogakusha) 9th ed. chapter 4.
 - 32. M. Friedman, "The Methodology of Positive Economics" in M. Friedman, *Essays in Positive Economics*, Chicago, (1935).
 - 33. E. Fama, "Efficient Capital Markets : A Review of Theory and Empirical Work", *Journal of Finance* (25), May 1970, p.383.

The market scenario that underlies this definition of efficiency considers the stock market to be made up of many investors all actively attempting to determine future security prices based on the price sensitive information currently available. These estimates of future prices imply an expected return from each security and thus provide investors with the justification to either trade or not.

The condition that the EMH puts on this investment process requires that the set of price sensitive information available to the market at any one time does in fact represent the complete set of such information. An implication of this condition is that the market as a whole accurately assesses the importance of the various information inputs and that the resulting prices are in fact the correct prices.

While the EMH is intuitively attractive it is unfortunately a difficult hypothesis to adequately test. There are two reasons for this. Firstly the theory as described above is not directly testable. As we cannot observe a future set of security prices we cannot test whether or not expectations are being accurately reflected in current prices. However we can to some extent get round this problem by establishing parameters for one particular item of price sensitive information. We might not be able to currently observe future prices but we can certainly hypothesise an equilibrium pricing model against which the market's efficiency in processing information can be tested. The implications of

assuming a particular model in different tests of market efficiency is often ignored but its importance is well established.

"Any (efficiency) test is simultaneously a test of efficiency and of assumptions about the characteristics of market equilibrium. If the test is successful - that is if the hypothesis that the market is efficient cannot be rejected - then this also implies that the assumptions about market equilibrium are not rejected. If the tests are unsuccessful, we face the problem of deciding whether this reflects a true violation of market efficiency ... or poor assumptions about the nature of market equilibrium."³⁴

The second difficulty that testing the EMH presents is that the generality of the hypothesis precludes its full testing. In consequence we find reported empirical results centre on the market's efficiency in dealing with specific sub-sets of information. Three broad categories of information sub-sets are usually identified in the literature. They are the weak, semi-strong and strong forms of the EMH. As a result of this necessity to test the EMH "piece meal" drawing conclusions as to the overall efficiency of the market involves a judicial "balancing of the evidence".

Table 2(i) summarises the key characteristics of the three forms of the EMH together with the equilibrium pricing models usually assumed for the particular tests.

34. E. Fama, *Foundations of Finance*. Blackwell (Oxford), 1977, p.137.

TABLE 2(i)

<u>Tests of the Efficient Market Hypothesis</u>			
Characteristics	Test Category		
	Weak Form	Semi-Strong Form	Strong Form
Information Sub-Set	Historic Prices	Publically Available Information	Information Available to any Investors
Equilibrium Pricing Model	(i) $E(R_i) = 0$ (ii) $E(R_i)$ are constant	(i) $E(R_i) = \alpha_i + \beta_{im} E(R_m)$	(i) $E(R_i) = R_f + \beta_{im} [E(R_m) - R_f]$ (ii) $E(R_i) = E(R_0) + \beta_{im} [E(R_m) - E(R_0)]$
Examples of Test Methodology	<u>Under :</u> (i) Filter Tests (ii) Serial Correlation	Information Content of Stock Splits	The Identification of Consistently Superior Performance

Note :

1. $E(R_i)$ Expected Return on Security .

$E(R_m)$ Expected Return on the Market

R_f Return on a risk free asset.

$E(R_0)$ Expected return on a security whose co-variance with the market is 0.

$\alpha_i \beta_i$ Linear coefficients

Whether or not the equilibrium pricing models are reasonably accurate representations of the price-determining process is primarily an empirical matter. However to the extent that it is difficult to find evidence in favour of rejecting the EMH then the adequacy of the models would be confirmed. Although this is indeed the case with the majority of EMH tests the evidence against rejecting efficiency and the underlying model is relatively more conclusive for the weak and semi-strong tests than for the strong form tests.

Our approach to reviewing the empirical evidence is selective. While the majority of reported EMH tests are sourced from U.S. stock markets and in particular the New York Stock Exchange our main concern is the efficiency of the ITC sector on the London Stock Exchange. With this in mind we present only a brief cross-section of the available evidence concentrating principally on the reported conclusions rather than the detailed methodology.

Looking first at the reported U.S. results on weak form tests the key aspects are summarised in Table 2(ii)^{35,36,37,38,39,40,41}

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- 35. S. Alexander, "Price Movements in Speculative Markets: Trends or Random Walks", *Industrial Management Review*, May 1961, pp. 7-26.
 - 36. C. Granger and O. Morgenstern, "Spectral Analysis of New York Stock Market Prices", *Kyklos* (1963), pp. 1-27.
 - 37. "Some Characteristics of Changes in Common Stock Prices", in P. Cootner, *The Random Character of Stock Market Prices* (Cambridge, Massachusetts) 1964, pp. 139-161.
 - 38. S. Alexander, "Price Movements in Speculative Markets: Trends or Random Walks", *Industrial Management Review*, Spring 1964, pp. 24-46.
 - 39. E. Fama, "The Behaviour of Stock Market Prices", *Journal of Business*, January 1965, pp. 34-105.
 - 40. E. Fama and M. Blume, "Filter Rules and Stock Market Trading", *Journal of Business*, January 1966, pp. 226-241.
 - 41. R. Hagerman and R. Richmond, "Random Walks, Martingales and the OTC.", *Journal of Finance*, September 1973, pp. 897-909.

TABLE 2(ii)

Weak Form Tests of Market Efficiency		
U.S. - Evidence		
Authors	Test Approach and Data	Results
Alexander (1961, 1964)	Filter trading strategies applied to daily price data 1897-1959 from the NYSE. Filters ranged from 1-50%.	Not possible to beat a buy and hold strategy after deducting trading costs.
Granger and Morgenstern 1963	Spectral analysis used on various U.S. indices including the S and P composite over differing periods to 1961. Spectral analysis identifies underlying oscillations in time series.	Some evidence of long-term dependency but not sufficient to reject the hypothesis of randomness.
Moore 1964	Serial correlation tests on weekly price returns for 29 U.S. stocks over the period 1951-1958.	Average serial correlation coefficient with lag 1 for all stocks reported as -0.06.
Fama 1965	(i) Serial correlation tests on daily price returns for the 30 stocks comprising the Dow Jones index 1957-1962 (ii) Runs test on the same data for non-randomness in sign changes.	(i) Average serial correlation coefficient with lag 1 reported as 0.03. (ii) Only very slight evidence of non-randomness.
Fama and Blume 1966	Filter tests on the Dow Jones 30 companies 1957-1962. Filter range from 0.5% to 50%.	Slight evidence that very small filters produce better profits than a buy and hold strategy but not after deducting trading costs.
Hagerman and Richmond 1973	(i) Serial correlation tests on monthly total returns for 253 securities on the OTC market. (ii) Runs Test on the same data.	(i) Average serial correlation coefficient -0.0762. (ii) No significant runs noted.

Based on reasonably simple models of market equilibrium the overall conclusion on the U.S. weak form tests is that the efficient market hypothesis as it relates to the informational content of historic prices cannot be rejected. Of particular interest is the result by Hagerman and Richmond working with data from the OTC market rather than the more widely tested NYSE. That the empirical results can be replicated on other stock exchanges is an important and necessary contribution.

The two main test forms, serial correlation based on the assumption that the underlying return distribution is normal and the distribution free runs test provide useful alternative methodological approaches although both do suffer from certain limitations. For example the serial correlation test only tests a relatively simple linear relationship and the runs test is perhaps too rigid in the sense that runs terminate on the first sign change. However even with these restrictions the conclusion that successive prices follow a random walk thus implying a high degree of weak form market efficiency appears safe.

The practical implication of this result suggests that any attempts to predict future prices from either a trading rule or the analysis of past trends will not be rewarded.

Unlike the weak form tests where the information sub-set historical prices is clearly defined semi-strong form and strong form tests cover a wide range of information sub-sets within their respective areas of publically available information and restricted information. Looking first at semi-strong form tests Table 2(iii) summarises a selection

of results using U.S. data.^{42,43,44,45}

Each of the authors use the market model of equilibrium prices although Ball in addition presents his results using CAPM. The adequacy of these models in reflecting the pricing process is increasingly being questioned. However for the purposes of assessing semi-strong form tests of the EMH they would appear reasonably adequate at least to the extent that on received evidence it is still difficult to reject the hypothesis of market efficiency.

Of the four results reported those by Ball and Brown, FFJR, and Ball are typical of the vast bulk of semi-strong EMH tests. The usefulness of Annual Income Statements as timely sources of price sensitive information is clearly questioned by Ball and Brown. Indeed as they defined the effective date of the Annual Income Statement as an information source to be the earlier date of the preliminary earnings announcement then the usefulness of the formal Annual Income Statement to market participants is further reduced in spite of the "wealth of information" it contains. The FFJR test is generally considered the most conclusive test of semi-strong efficiency. Not

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- 42. R. Ball and P. Brown, "An Empirical Evaluation of Accounting Income Numbers", *Journal of Accounting Research*, Autumn, 1968, pp. 159-178.
 - 43. E. Fama, L. Fisher, M. Jensen and R. Roll, "The Adjustment of Stock Prices to New Information", *International Economic Review*, February 1969, pp. 1-21.
 - 44. R. Ball, "Changes in Accounting Technique and Stock Prices", *Journal of Accounting Research - Supplement* 1972, pp. 1-38.
 - 45. M. Scholes, "The Market for Securities: Substitution versus Price Pressure and the Effects of Information on Share Prices", *Journal of Business*, April 1972, pp. 179-211.

TABLE 2(iii)

Semi-Strong Form Tests of Market Efficiency			
U.S. Evidence			
Authors	Information Sub-Set	Test Approach and Data	Results
Ball and Brown 1968	Annual Earnings Announcements	The authors report that in excess of 80% of the total information available about a company's annual earnings is contained in the Annual Income Account. They test the speed with which the market reacts to earnings announcements for 261 companies between 1957 and 1965.	The market is reported to have anticipated the Annual Income Accounts to the extent that no abnormal performance can be observed even in the announcement month.
Fama, Fisher, Jensen and Roll 1969	Dividend Changes	Dividend changes reflect management expectations as to future earnings. Therefore stock prices will be sensitive to dividend information. As dividend increases very often follow stock splits - stock splits are a source of dividend information. The speed with which the market reacts to the informational content of stock splits was investigated for 940 splits on the NYSE between 1926-60.	<ul style="list-style-type: none"> (i) Where the subsequent dividend increased - only very small positive abnormal returns in the splits to dividend period. (ii) Where the subsequent dividend decreased - small negative abnormal returns in the split to dividend period. (iii) The market therefore reacts quickly and accurately to the informational content of the split announcements and certainly before the change of dividend announcement.
Ball 1972	Changes in Accounting Policy that Resulted in a Reposted Income Change.	If the market anticipates the reported earnings of a company (Ball and Brown above) will it do the same for income-sensitive changes in accounting policy? 237 policy changes (including inventory, depreciation, expenses and revenue) from 197 companies between 1947 and 1960 provided the data base.	The reported results indicate little abnormal price movement either in the month of the accounting change or in the preceeding and succeeding months. The market would appear to "see through" accounting conventions to the underlying real values.
Scholes 1972	Informational Effect of Secondary Issues on Price	<p>Scholes reports that the price falls associated with 345 large secondary sales of stock between 1961 and 1965 are small thus implying an elastic demand curve for stock. He then tests whether these price falls are;</p> <ul style="list-style-type: none"> (i) a necessary inducement to investors to take up the stock; <p>or</p> <ul style="list-style-type: none"> (ii) The result of a revaluation of expectations about the stock based on the information content of the secondary sale. 	The reported results indicate that there were no positive abnormal returns achieved in the post sale period. In addition sales by Corporations and Officers were followed by larger price falls than for other investor groups suggesting that the market is very efficient in recognising the signal from these reasonably privileged investors.

only does the market pre-empt the dividend announcement but does so quickly and accurately. They note that this process is certainly completed by the end of the split month but, "... most probably almost immediately after the announcement". In the two remaining results reported Ball extended the earlier contribution of Ball and Brown and Scholes reported the speed with which the market reacted to large sales by potentially well informed sellers.

In Table 2(iv) we detail a selection of reported test results on the strong form of the EMH that use U.S. data.^{46,47,48,49}

Strong form tests of the EMH deal with the potential for profitable trading that possession of either inside information or superior information may lead to. Almost by definition we would expect insiders to have access to information sources that if traded on would yield substantial profits. This is indeed the case. The reported results of Lorie and Niederhoffer and perhaps more dramatically the results of Pratt and de Vere support this conclusion. Collins by examining an information source that was initially restricted and subsequently became public concentrates not so much on observed insider activity but on the potential for profit that restricted information allows.

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46. M. Jensen, "The Performance of Mutual Funds in the Period 1945-1964" May 1968, pp. 389-416.
 47. J. Lorie and V. Niederhoffer, "Predictive and Statistical Properties of Insider Trading", *Journal of Law and Economics*, 1968, pp. 35-53.
 48. "SEC Product Line Reporting and Market Efficiency". Reported in T. Dyckman, D. Downes and R. Magee, *Efficient Capital Markets and Accounting - A Critical Analysis* (New Jersey), 1975, p.30.
 49. S. Pratt and C. De Vere, "Relationship between Insider Trading and Rates of Return for NYSE Common Stocks 1960-1966". Unpublished Manuscript, University of Chicago (1968). Reprinted in J. Lorie and R. Brealey, *Modern Developments in Investment Management* (New York), 1976, pp.268-279.

TABLE 2(iv)

Strong Form Tests of Market Efficiency			
U.S. Evidence			
Author	Information Sub-Set	Test Approach and Data	Results
Jensen 1968	Investment Performance	Mutual fund managers can be expected to obtain superior information about investment opportunities than other perhaps non-professional investors. If the market is efficient then even these privileged investors will not be able on average to record consistently superior performance over a buy and hold portfolio of the same risk level. This proposition was tested using monthly total returns for 115 open ended mutual funds 1955 - 1965.	Reported results indicate that superior performance over a buy and hold portfolio was not on average achieved. Indeed there is little evidence that individual funds were able to return performance levels better than could have been achieved by chance. This result held even when management expenses were added back to achieved returns.
Lorie and Niederhoffer 1968	Insider Trading	Working with data from 100 companies between 1950 and 1960 three questions were addressed. (i) Are periods of intense insider trading followed by large price changes? (ii) Does insider trading affect price volatility? (iii) Do certain companies provide higher insider trading profits than others?	Reported results under; (i) Yes (ii) No (iii) No Expanding the positive answer to (i) it was noted that periods of intensive insider buying were followed large positive abnormal returns.
Collins 1975	Non-Public Earnings Information	The SEC requirement in 1970 for companies operating in more than one business to submit segmented reports was accompanied by a first year requirement that 1970 10-K statements should contain comparative data for 1967-1969. This segmented information was not previously available to the public. Collins prepared two sets of estimated earnings for the years 1968, 1969 and 1970 one based on the segmented reports and one based on the publically available consolidated earnings and tested whether a profitable trading rule could be developed using the segmented earnings information.	Reported results show that the segmented reporting information was a better predictor of future earnings than the consolidated data. Profits could be earned using this non-public information. This result held for the years 1968 and 1969 but not 1970 the year when segmented reporting went public. The market was therefore not efficient in dealing with non-public information of 1968-1969.
Pratt and De Vere 1976	Insider Trading	Starting at 1960 the rates of return achieved by 483 stocks on the NYSE from the date of a recorded insider buy or insider sell to 1966 were computed and divided into the two insider groups. Of the 483 stocks used 211 represented "buy signals" and 272 "sell signals". The frequencies of occurrence of the two signals were evenly distributed over the test period.	The average return following "buy signals" was approximately 17% p.a. greater than that following the "sell signals". This difference in returns between the two groups suggests profitable trading opportunities for insiders.

The popularity of many mutual funds (unit trusts) is based on the belief that professional management with access to superior information and analytical techniques can provide the "ordinary investor" with a greater return than he could have achieved on his own. In a sophisticated study Jensen reported that there was no apparent evidence to suggest that mutual funds consistently outperformed buy and hold strategies. This result is interpreted in the sense that the efficiency of the market is such that even the informational advantages held by professional managers are insufficient to ensure consistently superior performance.

There are many reported results on the EMH in the U.S. context.^{50,51} The balance of evidence is broadly represented in Table 2(ii), (iii) and (iv) above. On this basis it is difficult to reject the EMH. While insider information can as we would expect lead to superior trading opportunities it is unlikely that insider trading is quantitatively important. Thus in the context of the efficiency of the market mechanism we consider the results of strong-form tests based on insider trading in the U.S. as expected and interesting but of rather less importance than the other reported results.

The U.K. results on the EMH are not as conclusive as the U.S. results. We follow the same format in reviewing this evidence dealing first of

50. E. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, May 1970, pp. 383-417.

51. T. Dyckman, D. Downes and R. Magee, *Efficient Capital Markets and Accounting - A Critical Analysis*. (New Jersey), 1975.

all with weak form results. These are described in Table 2(v).^{52,53,54, 55, 56.}

The results based on serial correlation tests (Brealey 1970, Dryden 1970) report coefficients of the order 0.2 and 0.3. These are considerably larger than the results of the equivalent U.S. tests (0.03, 0.06, etc). It is clear that on daily price relatives there is some time series dependency at the first order level. However both authors conclude that it is insufficient to reject the weak form EMH. On the other hand Kemp and Reid using a range of non-parametric techniques in something of a 'shotgun' approach are far less optimistic. Their conclusion, "... that share price movements were conspicuously non-random over the period ..." is not mirrored in any of the U.S. results. A particularly interesting aspect of their work involved the effects of non-trading which when removed from the data reduced the proportion of securities showing evidence of non-randomness from 80% to 50%. Grimes and Benjamin reached a broadly similar conclusion using a large sample of individual companies. Their work included a brief comment on sector differences in efficiency and it is revealing to note that, "... a large proportion of the non-random stocks were financial stocks, i.e. investment trusts etc."

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52. R. Brealey, "The Distribution and Independence of Successive Rates of Return from the British Equity Market", *Journal of Business Finance*, 1970, pp. 29-40.
 53. M. Dryden, "Filter Tests of U.K. Share Prices", *Applied Economics*, 1970, pp. 261-275.
 54. M. Dryden, "A Statistical Study of U.K. Share Prices", *Scottish Journal of Political Economy*, 1970, pp. 369-389.
 55. A. Kemp and G. Reid, "The Random Walk Hypothesis and the Recent Behaviour of Equity Prices in Britain", *Economica*, 1971, pp. 28-51.
 56. D. Grimes and A. Benjamin, "Random Walk Hypothesis for 543 Stocks and Shares Registered on the London Stock Exchange", *Journal of Business Finance and Accounting*, 1975, pp. 135-141.

Weak-Form Tests of Market Efficiency

U.S. - Evidence

Authors	Test Approach and Data	Results
Brealey 1970	Working with the daily price relatives between April 1962 and October 1968 Brealey investigated both the distributional properties or returns on the FTA-All Share Index and their time series dependency.	(i) Distributional Characteristics; Although the distribution of the FTA-All Share returns was symmetrical it differed from a normal distribution by having more observations in the tails, less in the middle ranges and more in the centre. Non-stationarity suggested as the likely explanation. These differences were not considered sufficient to reject return normalcy as a good working hypothesis. (ii) Dependency; First order serial correlation coefficient - 0.219. After consideration of several reasons including dividend payments, ex-dividend dates and non-simultaneous recording of prices the overall conclusion reported some non-randomness but not sufficient for profitable trading or grounds to reject weak form EMH.
Dryden 1970	Dryden reported the results of filter tests, serial correlation tests and a brief investigation into the distributional form of three indices - FTA-500, FTA-Capital Goods and the Daily Mail Ordinary. The period covered daily price relatives between 1963 and 1967.	Small filters consistently produced higher returns than either larger filters or a buy and hold strategy. (Work on individual companies confirmed this result). Transaction costs were not taken into account. Serial correlation coefficients on the FTA-500 and the FTA-Capital Goods were reported as .28 and .31 respectively. The Daily Mail index result was .16. The distributional properties of the indices were similar to those reported by Brealey. The Dryden conclusion suggested considerable non-randomness in the indices examined.
Dryden 1970	Dryden reported results of filter tests, runs tests serial correlation tests and a brief investigation into the distributional form of the returns on each of 15 securities. The period covered daily price relatives 1963-1967.	Reported results indicate that the hypothesis of random price movements could not be rejected with either filter, runs or serial correlation tests. The distributional form of the returns was noted as slightly leptokurtic with a positive skew as compared to the normal distribution.
Kemp and Reid 1971	Kemp and Reid were primarily concerned with developing a methodology that did not rely on any underlying data distributional characteristics. They suggested a series of non-parametric tests and demonstrated their application on 52 daily returns for 50 securities between October 1968 and January 1969.	Kemp and Reid reported that after adjusting for non-trading approximately 50% of their sample showed evidence of non-randomness. These over-all results were accompanied by a considerable variation between the various individual companies. Their conclusion suggests that the random walk hypothesis has been dangerously over-generalised.
Grimes and Benjamin 1975	The authors worked with daily, weekly and fortnightly prices for 543 securities between October 1968 and April 1971. They used two tests based on "fluctuation theory".	Of the 543 stocks examined 30% were reported to behave like a genuine random walk while 20% were noted as deviating significantly from a random walk. Of particular interest was their result that a large proportion of the non-random stocks were financial stocks including investment trusts.

We move on to describe four tests of semi-strong market efficiency that while still broadly supporting the EMH do indicate that its acceptance is perhaps not quite as complete as in the U.S.^{57,58,59,60} The results are reported in Table 2(vi).

Until recently the scope of tests on semi-strong and strong form efficiency in the U.K. was hampered by a lack of extensive data bases that could provide full details of capital changes, dividends etc. With the formation of the London Business School Share Price Data-base this situation has to some extent been rectified. Indeed the majority of the studies reported in Table 2(vi) on semi-strong form tests and in Table 2(vii) on strong form tests use LBS data.

The earliest study cited (Morris) is unfortunately not rigorous. In particular the "information release" dates for inflation adjusted earnings are very probably not unique. The companies themselves or indeed other stockbroking firms may well have pre-empted the dates used. Firth's results are interesting in that his conclusion is considerably stronger than that of Marsh. Unfortunately his data is restricted in that it covers only two years 1973-1974. In addition it should be noted that the period 1973-1974 covers the long bear market following the late 1973 stock market "collapse". It would be useful to know if the results held in more typical market conditions. More substantial support for the EMH comes from Franks et al although again there are

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- 57. R. Morris, "Evidence of the Impact of Inflation Accounting on Share Prices", *Accounting and Business Research*, Spring 1975, pp. 82-90.
 - 58. M. Firth, "An Empirical Investigation of the Impact of Announcement of Capitalisation Issues in Share Prices", *Journal of Business Accounting and Finance*, Spring 1977, pp47-60.
 - 59. J. Franks, J. Broyles, M. Hecht, "An Industry Study of the Profitability of Mergers in the U.K.", *Journal of Finance*, December 1977, pp.1513-1525.
 - 60. "Equity Rights Issues and the Efficiency of the U.K. Stock Market", *Journal of Finance*, September 1979,

TABLE 2(vi)

Semi-Strong Form Tests of Market Efficiency			
U.K. - Evidence			
Authors	Information Sub-Set	Test Approach and Data	Results
Morris 1975	Accounting Information	Morris noted that as a result of popular interest in inflation accounting stockbroking firm occasionally produced lists of inflation adjusted earnings for large samples of individual companies. He identified three such periods in the 1970s - December '71, March '73 and April '74. Using the FFJR approach he tested the reaction of share prices to the informational context of the inflation adjusted earnings. Data from 132, 136 and 53 companies were used for the 12/71, 3/73 and 4/74 periods respectively.	The results report that in the post-publication period no abnormal returns of any significance were recorded. One aspect of the results is difficult to interpret. He notes that abnormal returns were often in an opposite direction to that which would be expected given the anticipated effect of inflation on the sample companies.
Firth 1977	Stock Splits	Scrip issues are usually accompanied by announcements of dividend increases. Abnormal returns around the announcement date should if the market is efficient relate solely to the dividend effect and not to the purely "mechanical" scrip pricing effect. Firth tested for this using 227 capitalisations in the period 1973-1974. An FFJR methodology was employed.	Scrip issues Firth reported have no impact on share prices thus the stock market is efficient in accounting for the "mechanical" pricing effect of a scrip issue.
Franks, Broyles and Hecht 1977	Mergers	The authors were primarily concerned with assessing whether or not abnormal returns accrued to shareholders of the companies involved in mergers. An implication of their methodology and results would be that if the market was efficient it would anticipate any abnormal returns prior to the merger announcement. The study was confined to 70 mergers in the "Breweries and Distilleries" sector between 1955 and 1972. An FFJR methodology was employed.	In addition to reporting results on mergers and shareholder returns the authors noted that the market appeared to be efficient in anticipating mergers at least three months before any merger announcement.
Marsh 1979	Rights Issues	Marsh was interested both in the efficiency with which the market reacted to rights issues announcements and in providing some U.K. evidence on the demand elasticity for U.K. equities. He used several different methodologies including CAPM and FFJR on samples that ranged from 1000 rights issues to 250 depending on the data requirements of the particular methodology. The periods covered ranged from 1955 to 1975.	His results on demand elasticity broadly supported those of Scholes. (Demand elasticity was estimated at -300). However the results on market efficiency are ambiguous. While the overall conclusion fails to reject market efficiency his results indicate consistent and positive abnormal returns in the post-announcement period. This result was invariate to the model used. Interestingly Marsh notes that the large abnormal returns were associated with smaller companies. He suggests that as the rights issue sample is equally weighted and the market factor is value weighted the larger returns available on small companies are "flowing through into the abnormal returns measures.

limitations. In particular only one sector was tested and within this sector the sample size was 70.

Marsh's results represent the most comprehensive U.K. research into the EMH. He employed large samples and obtained results using several different methodologies. His suggestion on the importance of size as a priced variable is extremely useful. We note in passing that the large number of small to medium sized companies on the London Market as compared to the NYSE may well support the existence of a "size factor". Recent work on the NYSE strongly suggest a priced variable related to size although interestingly its presence does not appear to have biased U.S. results on the EMH in the way suggested by March for the U.K.⁶¹ In some respects Marsh's conclusion not to reject the EMH is surprising. As we noted in Table 2(vi) much of his evidence strongly suggests significant inefficiency.

Strong-form tests of the EMH using U.K. data have effectively been confined to replicating the U.S. performance approach on unit trusts. We report a typical test approach in this area together with similar studies on the performance of pension funds and investment trusts.^{62,63,64} The results are shown in Table 2(vii).

61. R. Banz, "The Relationship between Return and Market Value of Common Stocks", *Journal of Financial Economics*, 1981, pp. 3-18.

62. J. Holbrook, "Investment Performance of Pension Funds", *Journal of the Institute of Actuaries*, 1977, pp. 15-91.

63. M. Firth, "The Investment Performance of Unit Trusts in the Period 1965-1975", *Journal of Money, Credit and Banking*, 1977, pp. 597-604.

64. J. Guy, "The Performance of the British Investment Trust Industry", *Journal of Finance*, May 1978, pp. 443-455.

TABLE 2(vii)

Strong Form Tests of Market Efficiency			
U.K. Evidence			
Authors	Information Sub-Set	Test Approach and Data	Results
Holbrook 1977	Pension Fund Performance	Using annual results based on "questionnaires" from between 26 to 96 pension funds in the 1970-1975 period Holbrook attempted to identify superior performance.	His conclusions based on non-risk adjusted returns were very few funds consistently achieved above or below average performance.
Firth 1977	Unit Trust Performance	Firth using a CAPM methodology tested the performance of 70 unit trusts. He covered the period 1965-1976 and used annual total return data.	He could find no evidence of superior performance even after adding back management expenses.
Guy 1978	Investment Trust Performance	Working with monthly returns from 47 ITCs between 1960 and 1970 Guy used a selection of methodologies including CAPM to test for superior performance.	No ITC had performance measures (Jensen's alpha, Shape variability or Treynor volatility) that were significantly different from zero. However some evidence of significant non-zero performance was obtained using either an empirically estimated security market line or the zero-beta form of CAPM.

Holbrook's work while weak in the sense that it does not compare returns on a risk adjusted basis is useful as it represents one of the few published sources of comparative pension fund performance. Firth found strong support for the EMH in his work with unit trusts.

The most comprehensive work on U.K. fund performance is that by Guy. His results are of particular interest in that he deals with ITCs. Although his study was limited to 49 ITCs he employed several methodologies and over all his results support the EMH.⁶⁵

In reviewing both the U.K. and U.S. evidence on the EMH it is difficult to avoid the conclusion that reported U.K. results are far less convincing than those for the U.S. This conclusion would appear to hold at all three levels of the EMH. We stress that it has not been our intention to present a full and detailed analysis of tests for market efficiency. As our purpose was to assess the market environment within which ITCs must operate a description of the main and accepted conclusions was considered sufficient.

4. Foreign Investment : We noted in Chapter 1 the very substantial international exposure that the ITC sector maintained during the nineteen seventies. This level of exposure was significant both in terms of absolute value and in relation to that maintained by other financial intermediaries. Table 2(viii) describes the average U.K. - non-U.K. portfolio split for several such intermediaries.

65. A reference list for most U.K. tests on the EMH can be found in A. Henfrey, B. Albrecht and P. Richards, "The U.K. Stock Market and Efficient Market Model - A Review", The Investment Analyst, 1977, pp. 5-24.

both the relatively liberal 19th century and the more recent period without exchange controls could be considered as periods of exception rather than rule.⁶⁸

Modern exchange controls covered the period from 1947 until October 24 1979. On this latter date all exchange controls on foreign currency denominated portfolio investments were abolished. However while they existed they did represent a major parameter within which ITC managers had to operate. The authority for the post World War II exchange controls was found in the Exchange Control Act 1947 which was implemented through the Bank of England.

Our objective in this section is two fold. Firstly we describe the main methods of gaining foreign exposure open to ITCs. Secondly we indicate the relevant considerations involved in choosing between the premium and borrowing approaches.

(i) Methods of Gaining Foreign Exposure : There were five main methods of gaining foreign exposure during the nineteen seventies all of which were subject to exchange controls. The relative importance of each to the ITC movement was noted in Table 1(xvi) and in the comments to Table 1(xx). We now deal with each of the following in turn.

- (a) Investment Currency
- (b) Multi-Currency Loans
- (c) Back-to-Back Loans
- (d) Currency Swaps
- (e) Supplement 35 Loans

68. M. Hughes, "The Consequences of the Removal of Exchange Controls on Portfolios and the Flow of Funds in the U.K., de Zoete & Bevan, 1980.

- (a) Investment Currency : The most significant route for ITCs to gain foreign exposure was through the purchase of investment currency. The development of an investment currency market can be traced back to the financing requirements of World War II. In 1940 the holders of foreign currency securities were required to register their holdings with the Treasury. From time to time some of these securities had to be sold to the Treasury in return for sterling. Following the war those securities that were registered but unsold came under the "custodianship" requirements of the 1947 Act. They represented the only U.K. source of foreign exchange available to U.K. residents or companies for the purchase of foreign currency portfolio securities. During the early post-war years although the securities comprising this "pool" could be bought and sold for sterling direct trading between foreign currency securities of different currencies was not allowed. Gradually however this barrier was removed and by 1954 the only effective transfer restriction was between North American securities and those of other countries. The fund of North American securities was known as "hard" dollars and that of other currencies as "soft" dollars.⁶⁹ As convertibility between the various world currencies increased the need for this remaining division decreased and in May 1962 the two markets were amalgamated into one. The resulting investment currency market still however represented the only U.K. source of exchange for those investors seeking foreign portfolio exposure without borrowing. The main developments in the market after May 1962 that are relevant to our purpose are described in Exhibit 2(v).

69. Several names were used to describe the pool of foreign currency securities including investment dollars, switch dollars and security dollars.

EXHIBIT 2(v)

<u>Investment Currency Market</u> <u>Principal post May 1962 Change with Implications for ITCs</u>	
Date	Description
May 1962	Amalgamation of "hard" and "soft" dollar markets
April 1965	25% surrender rule introduced
June 1972	Exchange controls extended to cover the securities denominated in the currencies of the former Overseas Sterling Area.
March 1974	The sale of securities denominated in the currencies of the former Overseas Sterling Area attracted the 25% surrender rule.
January 1978	25% surrender rule abolished.
July 1979	The purchase of portfolio investment in most countries using official exchange was allowed.
October 1979	All exchange controls were abolished as from October 24.

Note: Source, Bank of England⁷⁰

70. Bank of England Quarterly, 1976, pps. 314-322.

An ITC that decided to gain foreign exposure by purchasing the required foreign currency through the premium market was faced with the problems of the dollar premium and the premium surrender rule. We look at each in turn.

The demand for investment currency was always such that it could only be purchased at a premium over the official exchange rate. While the premium was often calculated for convenience against the last fixed sterling-dollar parity of \$2.60 to £1 the true premium at any point in time was calculated against the current spot. Graph 2(i) traces the monthly true premium from February 1971 - October 24 1979.

Both the level and the variability of the premium are evident from Graph 2(i). Nine times it fell to below 15%. On the other hand for the most part of 1975 the rate was in excess of 60% peaking in June 1975 at over 85%. Unfortunately there is little quantitative evidence on the precise determinants of the premium. Indeed one author has suggested;

"... the behaviour of the investment premium defies analysis". 71

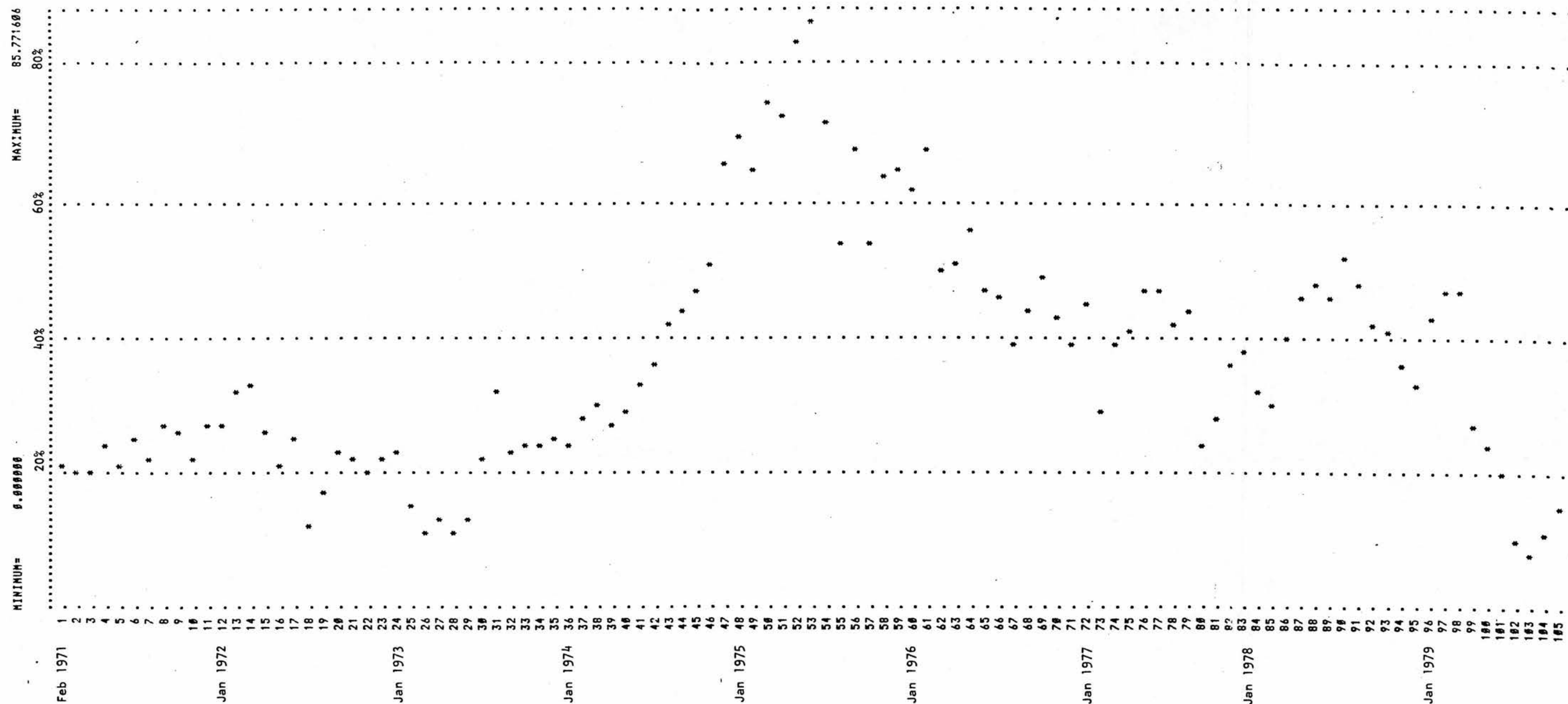
In this respect attempts at analysing the premium share much in common with attempts to analyse the discount at which ITC equities usually stand to their underlying net asset values!

We do not attempt to identify the various determinants of the premium or their relative importance. However we note that

71. J. P. Gurney; 'A Comparison between Premium Currency and Loans for Overseas Investment', Investment Analyst, No 44, 1976, pp. 17-22.

Investment Dollar Premium Based on the Current U.S. Dollar Spot Rates

Monthly observations : Feb 1971 - Oct 1979



Notes:

1. Source : Capital International

2. The premium is calculated from the following algorithm; $P_t = (S_t - I_t)/I_t$ 2(i)where ; P_t = Premium at the end of month t . S_t = Spot at the end of month t . I_t = Investment dollar spot at the end of month t .

Woolley has suggested that while many factors may underlie the premium and its variability the expected performance of the relevant foreign security markets will be crucial.⁷² He suggests that as the available pool of investment dollars is more or less fixed together with the fact that institutional investors allocate relatively fixed market-weighted proportions to the various world markets then there will be an inverse relationship between foreign market movements and the premium. Interestingly the correlation coefficient between the premium and Capital International's U.S. index is -0.69 which given the reasonable assumption that the U.S. is the major foreign destination for U.K. funds would lend support to Woolley's hypothesis.

One aspect of the premium market that was of particular concern to ITCs concerned the treatment of foreign dividends. As the premium market related only to capital transactions foreign dividends were translated at the higher spot rate of exchange. This resulted in downward pressure on reported yields. Given the perceived importance of yields noted in Chapter 1 many ITCs considered this translation effect an important restriction on the funds that could be allocated to non-U.K. markets.

The presence of the investment redemption or surrender rule between April 1965 and January 1978 was a method whereby premium dollars were transferred to the official market. The surrender rule operated by requiring 25% of the sale proceeds of foreign currency denominated securities originally purchased with premium dollars to be redeemed not through the investment currency market but

72. P. K. Wooley, 'Britain's Investment Currency Premium', *Lloyds Bank Review*, 1975, pps. 33-46.

through the official exchange. The sellers of these securities therefore lost the benefit of redeeming the full value of their assets at the lower investment dollar rate of exchange. The workings of the surrender rule and its implied "tax" cost are demonstrated in Exhibit 2(vi). Graph 2(ii) plots the movement of the implied tax rate on foreign security sales.

As the computation described in Exhibit 2(vi) implies the tax cost was closely related to premium levels. The average cost over the 83 months was 6.46% dropping below 3% four times and rising to a high of 11% in June 1975. There is no doubt that the presence of the surrender rule represented a real cost on non-U.K. portfolio transactions. The tax was particularly strongly criticised by the ITC movement where it was felt that it restricted ITCs from operating effectively in international markets - an area where they perceived they held a competitive advantage. Just what the absolute cost to the ITC movement was is extremely difficult to determine. However an approximate idea can be gained albeit by some restrictive assumptions through the following computation.

Let $.8x_t$ = Dollar value of ITC foreign currency sales in year t .

Approximately 80% of ITC foreign exposure was gained via the currency market.

S_t = Average spot rate in year t .

P_t = Average investment dollar rate in year t .

T_t = Average surrender tax rate in year t

where $T_t = .25 (S_t - P_t) / S_t$

Then

$$\text{Tax Cost } (\text{\pounds m}) = T_t [(.25 (.8x_t) / S_t) + (.75 (.8x_t)) / P_t]$$

EXHIBIT 2(vi)Investment Currency MarketSurrender Rule

<u>Assumptions</u> :	Sale Proceeds	\$50,000
	US - UK Spot Rate	\$2.5
	Effective Investment Premium	40%

(A) Premium Calculation :

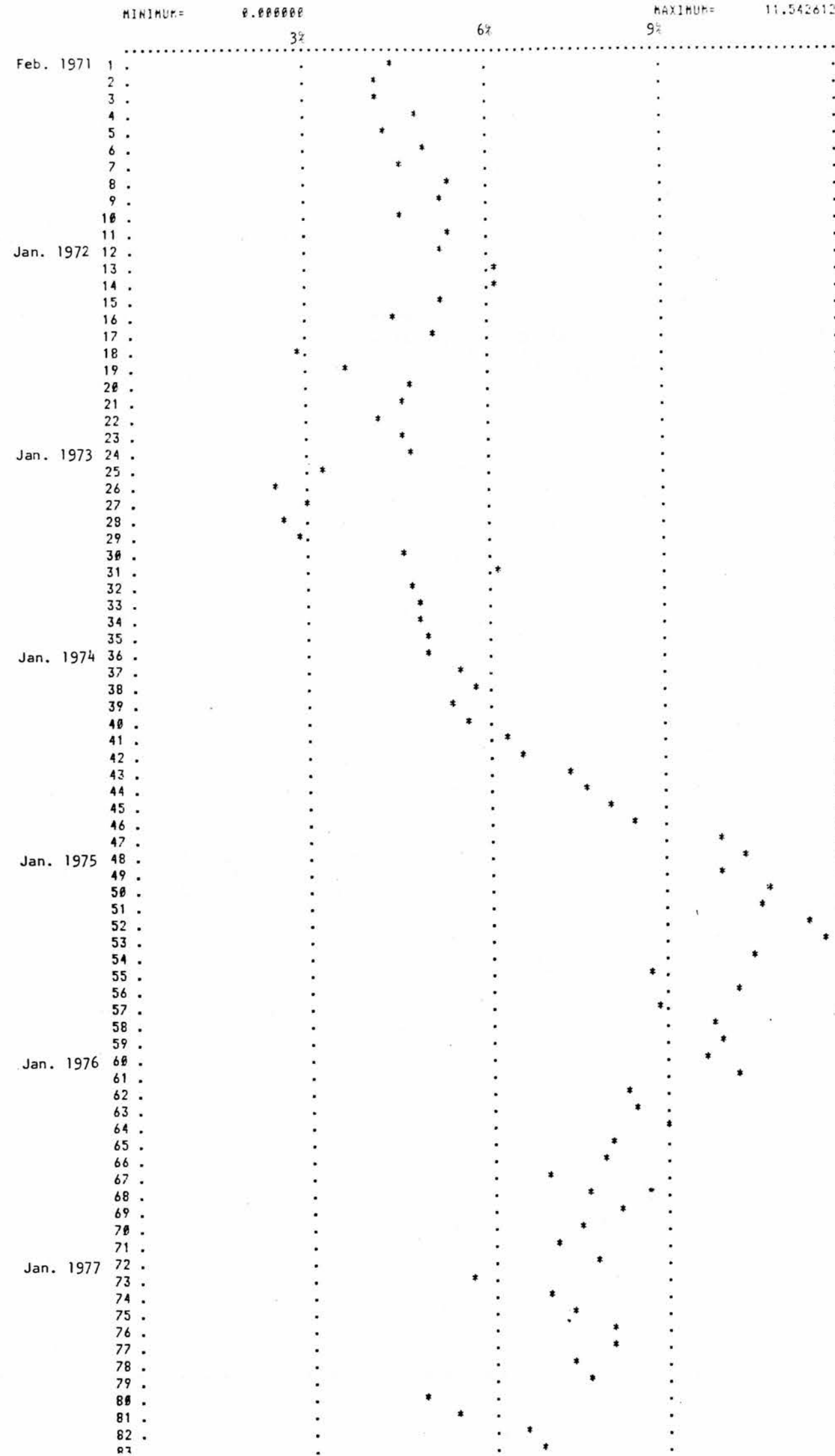
Sale Proceeds	\$50,000	
Translation c Spot		20,000
c Premium (2.5/1.4)		28,933
		<hr/>
Premium	£ 7,933	

(B) Surrender :

- Proceeds to be offered on the official
exchange 25% \$50,000 : \$ 12,500
- Cost of the surrender; £

\$12,500 c 1.79	6,983
\$12,500 c 2.50	5,000
	<hr/>
Cost (25% of £7,933)	£1,983
	<hr/> <hr/>
- Effective "tax"; 1983/27,933
= 7.1%

GRAPH 2(ii)



Investment Currency Market

Effective Surrender Tax Rate

Monthly Observations

February 1971 - December 1977

- Notes : 1. Source : Capital International
2. The effective tax algorithm is as follows:

$$T_t = .25(S_t - I_t) / S_t \quad 2(ii)$$

where T_t = Effective tax rate at the end of month t .

S_t = Spot rate at the end of month t .

I_t = Investment dollar rate at the end of month t .

The results of applying this formulation are shown in Table 2(ix).

TABLE 2(ix)

<u>Investment Trust Companies</u>							
<u>Tax Cost Implied by the Surrender Rate</u>							
Description	1971	1972	1973	1974	1975	1976	1977
ITC Foreign Security Sales £m (a)	293.3	465.0	726.2	627.3	385.2	466.2	473.1
Average of Spot	2.44	2.50	2.46	2.35	2.23	1.82	1.61
Average of Investment	1.98	2.03	2.06	1.69	1.32	1.22	1.26
Average of Tax Rate	4.70	4.70	4.00	7.00	10.20	8.20	5.40
Cost of Tax (£m) :							
To ITCs £m	28	46	62	80	58	51	34
Total Cost £m (b)	128	138	158	265	180	177	177

Notes: 1. Sources (a) Bank of England ⁷³

(b) Bank of England ⁷⁴

73. Bank of England Quarterly, 1976, pp. 314-322.

74. Bank of England Quarterly, Various Issues, 1971-1980.

To the extent that our estimates are reasonably accurate and we have no way of independently verifying this the cost to the movement over the decade was considerable.⁷⁵ In total some £359m was surrendered by the movement as the result of the redemption rule.

On the basis that the surrender rule acted as an intermediation cost one would expect a relationship to exist between the discount and the premium. Saunders and Woodward working with data for the four year period to 1975 hypothesised that the higher the expected premium then the lower will be the price an investor will offer for an ITC share and therefore, *ceteris paribus*, the higher the discount.⁷⁶ However their results reported a negative relationship between premium and discount. In Graph 2(iii) we plot the monthly relationship between the premium and the average monthly discount on 64 ITCs for the 84 months to October 1979.

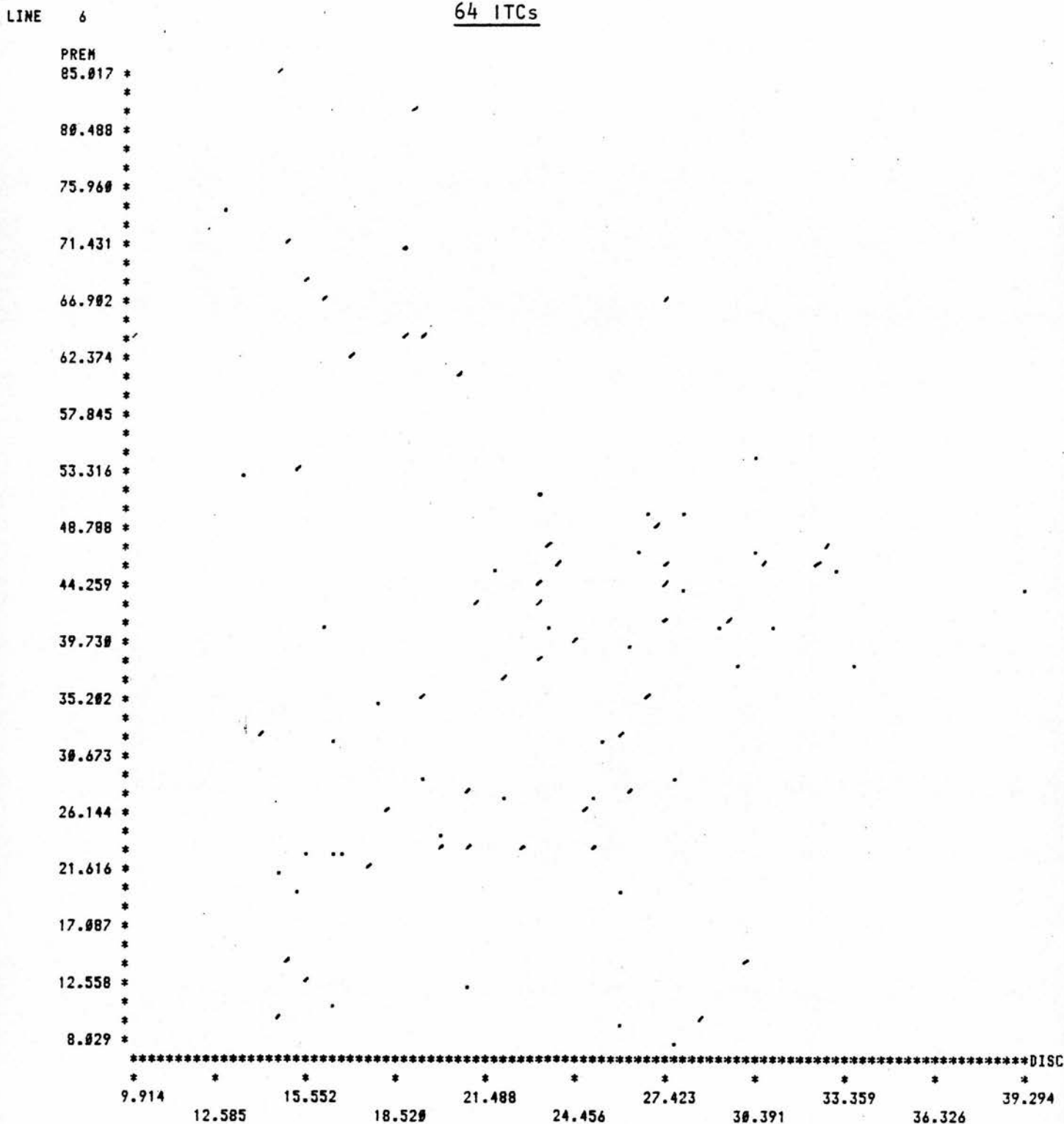
Clearly the relationship between the discount and the premium is extremely weak. Indeed the correlation coefficient over the 84 months covered by Graph 2(iii) was -0.0687. A further insight into the relationship between the premium and the discount can be gained by noting from Graph 2(ii) that the 105 month period covered by the graph can be divided fairly easily into a period of increasing premiums to June 1975 and thereafter a period of decreasing premiums. The correlation coefficient between the discount and the premium for the 32 months to June 1975 was -0.095 and for the remaining 52 months

75. The Bank of England were asked first of all if such figures were available. They were not. Secondly they were asked to comment on our estimates. They considered that the estimates were very probably on the high side rather than the low side. Their reasons for suggesting this were principally concerned with data weaknesses in the reported total premium figures.

76. A. Saunders, R. S. Woodward, "The Effect of the Foreign Investment Surrender Rule on Investment Trust Share Discounts", *The Investment Analyst*, January 1975, pp. 42-43.

Relationship between Premium and Discount

November 1973 to October 1979



to October 1979 was -0.383 . Therefore while the relationship between the premium and the discount is weakly negative over the whole period the negativity is considerably stronger in the period of declining premiums. These results would clearly support the findings of Saunders and Woodward. In doing so they cast doubt on the "practitioner" argument that the investment currency regulations had a strong positive influence on the discount. If anything the relationship was negative and unstable. Unfortunately any conclusion involving either discounts or premiums hinges crucially on the *ceteris paribus* assumption. In particular the discount captures the relationship between the whole portfolio and the equity price while the premium and the related surrender rule cover an average 30% of the portfolios. Thus there are many other influences that could affect discount levels. In view of this we do not wish our conclusion to do more than suggest a weakness in the "practitioner" position.

We now turn to consider the other methods by which ITCs could gain foreign exposure. However, we stress that during the 1970s by far the most important route was through the investment currency market. Indeed something in excess of 75% of foreign exposure was financed this way. In view of this predominance our review of the other methods is correspondingly brief.

- (b) Multi-currency Loans: In addition to the risks of exchange rate volatility multi-currency loans carried the risks associated with gearing. Clearly there were two decisions involved here the first to invest abroad and the second to sensitise the foreign exposure through gearing.

Exchange risks can of course be minimised by ensuring that funds

borrowed are in the same currency as the investments purchased. Multi-currency loans facilitate this by allowing managers to borrow a "package" of currencies with the option of changing currency mix at certain pre-determined dates. This option helps avoid either mis-matching loans and investments or the necessity of raising additional foreign currency to meet a new investment opportunity in a different currency.

During the period of exchange controls each foreign currency loan was subject to individual approval from the Bank of England and permission to proceed was conditional on the following undertakings.

- "1. To retain the investments purchased by loan currency in a separate portfolio.
2. To maintain a separate cover of investment currency investments. If the market value of the investments in the loan portfolio falls, the investor must purchase investment currency investments to maintain a cover (which includes both the loan portfolio investments and the investment currency investments at market value) at a level above 115% of the loan.
3. To repay the loan at a specific date out of the proceeds of sale of the loan portfolio investments. Any shortfall between the proceeds of the investments and the cost of repaying the loan must be accounted for by purchase of investment currency. However any surplus remaining after repaying the loan is treated as an investment currency asset and the dollar premium can be realised when that surplus is crystallised.
4. To pay interest on the loan out of dividends and other income from the loan portfolio investments. If this income (reduced by overseas withholding tax) is less than the interest payable, the difference must be settled either by proceeds of sale of part of the overseas portfolio or by purchase of investment currency." 77

From the above regulations it can be seen that there was a considerable inter-relationship between foreign currency borrowings and the premium

77. G.M.A. Crawford, "Financing Overseas Portfolio Investment", Investment Trust Handbook (AITC) 1978.

markets. Not only had foreign borrowings to be covered by additional assets purchased through the investment market but dividend and capital "shortfalls" and "surpluses" also involved investment currency transactions. Interestingly these latter transactions had an effect broadly equivalent to an additional element of gearing. For example a surplus on a portfolio realisation after repaying the currency loan was redeemed at the premium rate. Similarly a net loss on realisation had to be made good through the premium market. This additional "profit" or "loss" through having to use premium dollars clearly exposes equity holders to a further gearing element in addition to that initially involved in the foreign currency loan.

- (c) Back-to-back Loans : Back-to-back loans are both an interesting variation of multi-currency loans and an attempt to allow "borrowing without" gearing. They usually involve an international bank bringing together an ITC which deposits sterling at a fixed rate of interest as security for a foreign loan and an overseas company which wants to borrow sterling and deposits its domestic currency as security. The ITC then has access to the foreign currency deposit and the overseas company to the sterling deposit. While both recipients receive a fixed return from their own domestic currency deposit the capital value and the interest payable on the overseas loan will vary considerably depending on exchange rate movements. During most of the 1970s sterling decreased in value against most of the major currencies which effectively increased both the cost of interest payments and the amount of the capital liabilities. Although it is often maintained that back-to-backs involve no gearing they clearly do if the value of the investments change while the debt component in foreign currency

terms does not. In addition as with multi-currency loans back-to-backs were subject to the "shortfalls and surpluses" requirement of the exchange controls. As we noted above this in itself led to a gearing effect.

- (d) Currency Swaps : In 1976 the Bank of England gave approval for a variation to the established back-to-back schemes. This involved permission for the direct swap of sterling for an equivalent amount of a foreign currency. It is suggested that their introduction made it slightly easier for overseas companies to meet interest payments to foreign principals given that swaps were not strictly loans. (The liabilities are correctly shown on balance sheets as contingent rather than established.) However it should be noted that as far as the U.K. was concerned they were liable to the same exchange control provisions as back-to-backs and multi-currency loans.
- (e) Supplement 35 Loans : These loans were a specialised form of borrowing whereby an ITC could build up a portfolio of bonds from E.E.C. countries exempt from the usual exchange control regulations. Their introduction in 1977 was the first significant easing of exchange controls and reflected E.E.C. policy to gradually reduce barriers to European international capital movements. As we noted in Exhibit 2(v) all exchange controls were eventually removed in October 1979 therefore the usefulness of Supplement 35 loans was both limited and short-lived.
- (ii) The Premium and Loan Approach to Foreign Investment : Having completed out review of the various methods of gaining foreign exposure that were open to ITCs it is clear that they fall into two broad groups involving either borrowing foreign currency or transactions in the investment

currency market. ITCs in general preferred to purchase investment currency rather than borrow. Indeed as we noted above the percentage of foreign securities funded this way rarely fell below 75 to 80% for most of the decade. It is perhaps slightly unfair to directly compare the two methods as one involved a gearing decision in addition to the decision to purchase foreign securities. However given the dominance of the premium market in spite of its volatility and the surrender rule some comments on the choice are required. Table 2(x) details return characteristics on various foreign currencies including the investment dollar.

In Table 2(x) we treat foreign currencies as investments in their own right although it should be noted that at this stage the returns do not take account of interest rate differences in the various countries. The exchange rate observations that provide the basis for the monthly returns are the foreign currency equivalents of £1 sterling. Therefore a negative return sign implies an average monthly gain in sterling for a U.K. investor. The opposite is the case for a positive sign. Thus for example a U.K. investor would on average expect a gain in sterling terms from holding U.S. dollars. Indeed he could have expected a gain in sterling terms from holding any national currency apart from those of Spain and Italy. This merely reflects sterlings continued weakness against the world's currencies throughout most of the 1970s.

Interestingly it would not on average have been to a U.K. investor's advantage to hold premium dollars during this period. In addition to the extent that standard deviation is an adequate measure of investment risk then such an investment was almost twice as risky as a similar position in virtually any other currency.

TABLE 2(x)

<u>Currency Fluctuations</u> <u>Monthly Returns on 14 Currencies</u> <u>February 1971 - December 1980</u> (118 Returns)				
Currency	Mean Monthly Return	Standard Deviation	Range	
			Minimum	Maximum
U.S.	-0.000216	0.0262	-0.0707	0.0579
Investment Dollar	0.001434	0.0525	-0.1084	0.1615
Sweden	-0.001501	0.0259	--0.0744	0.1026
Germany	-0.005356	0.0329	-0.1083	0.1003
Japan	-0.004207	0.0342	--0.1144	0.1133
Australia	-0.000279	0.0273	-0.1055	0.1866
Holland	-0.004578	0.0315	--0.1173	0.1056
Italy	0.003983	0.0382	-0.1335	0.1670
Switzerland	-0.007653	0.0374	--0.1419	0.1540
Spain	0.000939	0.0281	-0.0854	0.2006
Denmark	-0.001987	0.0304	--0.1115	0.1072
Austria	-0.005291	0.0321	-0.1124	0.1094
Norway	-0.002939	0.0261	-0.0999	0.0917
France	-0.001785	0.0293	-0.1044	0.0979

Notes : 1. Source : Capital International⁷⁸

$$2. R_i = \text{Log} (X_{it}/X_{it-1})$$

where R_i = return on currency i.

X_{it} = spot exchange rate at month end t.

78. Capital International (Geneva) Inc.

It is of course unwise on the basis of the above analysis to conclude that ITCs in general chose the wrong method of gaining foreign exposure. Many other factors influenced the choice of investment route. For example the administrative difficulties involved in the setting up and monitoring foreign currency loans for the purpose of exchange controls, the costs of foreign currency borrowing, the penalties noted earlier that could result under exchange controls from asset shortfalls and of course the perhaps unwanted gearing could all act against choosing the foreign currency loan route. On the other hand exchange risks could be hedged and the surrender rule avoided. However the premium route was very much the accepted route. It has been pointed out to the author by a senior member of the investment community that administrative difficulties together with a "feeling" that the Bank of England very much favoured the premium route were the critical factors.

Interestingly we can show in slightly more qualitative terms the broad effect of choosing the premium route over the foreign currency route. Table 2(xi) reports the results of such a comparison between U.K. borrowing, investment dollar purchase and U.S. investment and U.S. borrowing and U.S. investment.

Clearly this is an extremely rough and ready investment scenario. However it does suggest that over the period as a whole U.S. exposure might have been more profitable gained by foreign borrowing rather than through a combination of U.K. borrowing and investment dollars. As we might expect the strength of the premium during the first half of the seventies suggests that the latter approach to U.S. exposure would have been more profitable during that earlier period.

TABLE 2(xi)

<u>Investment Trusts</u> <u>Alternative Routes to U.S. Investment</u> <u>\$ Premium and U.S. Borrowing</u> <u>105 Monthly Returns</u> <u>1971-1979</u>					
Period From - To	Observations	Alternatives U.S. Investment			
		U.S. Borrowing		U.K. Borrowing + Premium \$	
		Mean	Std. Dev.	Mean	Std. Dev.
1971 - 1975	53	-0.00072	0.05637	0.00312	0.06586
1976 - 1979	52	0.00179	0.04704	-0.01227	0.06558
1971 - 1979	105	0.00052	0.05172	-0.00450	0.06586

- Notes :
1. The cost of borrowing is taken as the three month T.B. rate in both the U.K. and the U.S.
 2. The returns are the continuously compounded returns including the dividend component on Capital International's U.S. index.
 3. The index values were translated to sterling at the month-end premium exchange rate. The 25% surrender rule was applied on returns up to the end of 1979.
 4. Dividends were translated back to sterling at the official month end exchange rate and re-invested at the ruling premium exchange rate.
 5. Both transaction costs and the foreign security and dividend cover rules that applied when portfolio investment was undertaken with foreign borrowings were ignored.

To conclude this section we look briefly at the post-October 1979 period. It is however an area we return to in Chapter 7. Undoubtedly the speed with which exchange controls were abolished took many institutions including ITCs by surprise. The immediate effect was a loss on portfolio valuations due to the removal of the premium element. The longer term effects are more difficult to assess. The removal of controls may persuade some non-ITC institutions to allocate a larger proportion of their portfolios overseas which with increasing expertise in this area would tend to undermine a traditional ITC intermediation function. Indeed Hughes working with survey data sourced from twenty institutions suggests that foreign holdings by institutions may well double following the removal of exchange controls.⁷⁹

Summary : In this chapter we have concentrated on the institutional parameters within which ITC managers must operate. These parameters very much determine the characteristics of the intermediation service produced. The four broad categories we considered, namely legal, tax, market and foreign represent the most important aspects of the business environment ITC managers must deal successfully with.

79. M. Hughes, "The Consequences of the Removal of Exchange Controls on Portfolios and the Flow of Funds in the U.K.", de Zoete & Bevan, 1980.

C H A P T E R T H R E E

INVESTMENT RETURNS

Introduction

Section 1 : The Computation of Investment Returns

Section 2 : Some Initial Observations

Section 3 : Distributional Characteristics

Section 4 : Time Series Dependency

Section 5 : Return Components

Summary

INTRODUCTION : Our objective in this chapter is to examine the returns achieved by a selection of ITCs during the 1970s.

In selecting ITCs to be included in the main empirical work the predominant concerns were coverage and representativeness. The objective was to identify the core of the ITC sector. To achieve this the main sample was made up of 97 of the largest ITCs at December 1980 that had been in existence throughout the 118 month period to December 31, 1980.

Size for this purpose was defined as assets under management although it was noted that the largest 100 ITCs accounted for more than 80% of the sector's total capitalisation. The choice of 118 months rather than the full ten years was the result of a data constraint. The bulk of the price data on individual ITCs came from the London Business School and a considerably larger sample of companies was available for the post-decimalisation period (February 1971).

The data was accumulated from the following sources :

- | | |
|--------------------------------------|---|
| (i) London Business School | - Share prices, dividend and capital information |
| (ii) Extel Cards | - Dividend and capital information |
| (iii) Grieveson Grant & Co. | - Capital information and gross assets under management |
| (iv) Wood Mackenzie & Co. | - U.K. index information and certain accounting data for individual ITCs. |
| (v) Association of Investment Trusts | - Net asset data-base. This was made available by the AITC through Wood Mackenzie & Co. |
| (vi) Ivory & Sime | - Rates of exchange and international market indices. |

In order to control the very substantial amounts of data involved a data-base was assembled in a standard format that allowed easy access to specific data on any ITC or index. The question of data accuracy is extremely important. The main elements of the data-base those from the London Business School and the AITC are widely used and both are extensively checked for accuracy and reasonableness. However a critical eye was still kept on these data sources and indeed an occasional error was identified and corrected. Extel cards and the Stock Exchange Daily Official Lists were the principal verification sources.¹ The accuracy of the data collected from the other sources was rigorously reviewed and where necessary verified with other sources. All the data was card punched for an ICL 2972 machine one of the several large computers operated by the Edinburgh Regional Computing Centre. The usual verification procedures for card punch data were followed.

A considerable amount of computing was required. The necessary programming was sourced where possible from standard packages namely TSP, ESP and SPSS.² However there were many areas where additional programming specific to a problem at hand was required. Where such programming was required this was undertaken by various members of the Business Studies Department, including Mr. Robin Day and Dr. Jan Kwiatkowski.

1. The Computation of Investment Returns : An investment return consists of two parts one capital and one income. Taken together they comprise the following measure of the total return on an equity investment

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1. J. Smithers, "London Business School Share Price Data-Base", London (1977). This publication includes details of the various data checks undertaken by the London Business School.
 2. TSP : Time Series Software Package - University of Chicago.
 ESP : Econometric Software Package - University of Chicago.
 SSPS: Statistical Package for Social Sciences - McGraw-Hill.

to a shareholder over a given period.

$$R_i = (P_{it} - P_{it-1} + D_{it}) / P_{it-1} \quad 3(i)$$

where;

R_i = Total return over period $t-1$ to t .

P_{it-1} = Price of security i at $t-1$

P_{it} = Price of security i at t

D_{it} = Dividend distribution on security i

It is important to include both components of return in any investment return measure. Failure to do so will result in returns not reflecting the full return attributable to security ownership. The relative importance of the two components changes over time. In general this is due to positive attempts by companies to maintain a considerable degree of stability in their distribution policies. As a result of this the dividend component in total return generally increases during periods of market decline and decreases when the market is rising.

Returning to equation 3(i) it is necessary to give more adequate definitions for the various component parts of return in order to establish an empirical content. In particular we examine the following :

- (i) Security prices
- (ii) Capital changes
- (iii) Dividends
- (iv) Taxation.

- (i) Security Prices : There are three prices available for each security on the stock exchange. The first two represent the jobbers' purchase and sale quotes while the third represents an ultimate bargain or transaction price. Clearly the transaction price is the one with the most economic significance. However U.K. stock exchange analysts have traditionally been content to use an easily available surrogate for transaction prices namely the average mid-point of the bid-ask ranges quoted by each jobber. The spreads are entered by each jobber on prepared boards which are collected at the close of business and then updated for any after hours trading. This data provides an input for the various FT information services. An alternative mid-market price is available from the Stock Exchange Daily Official List. The FT data is usually preferred by analysts principally because the Stock Exchange Daily Official List is drawn up at 2.30 p.m. which is prior to the close of business and therefore does not cover the full day's trading.

While great care is obviously taken with the preparation of the FT mid-market prices there is no way round the problem of relevance. They do not reflect true transaction prices and in addition there is no obvious connection between mid-market prices and ultimate transaction prices.

Recognising these problems the ITC prices we use in this study are actual transaction prices. There are however two difficulties associated with the use of transaction prices. First of all they are only recorded for public use on a voluntary basis. The available population of recorded prices known as marks is therefore not the same and indeed is considerably less than the total number of transactions for a given security. There is no obvious way round this difficulty and it is quite possible that an element of bias weights a jobber's decision on whether or not to record a mark.

For example it is sometimes suggested that in busy market conditions jobbers are unwilling to take time to record marks. As the percentage of bargains recorded as marks has declined by 20% to approximately 30% over the decade the possibility of bias being present in the population of marks may well have increased.³

The second difficulty which would be present even if all bargains were recorded concerns infrequent trading. It may well be that in any given period a particular security has not been traded. To use the price of the prior period or some other surrogate would obviously be imprecise. This problem which has long been recognised is of particular relevance to the London Stock Exchange where there is a disproportionately large number of small companies than compared to say the New York Stock Exchange.⁴ A characteristic of many small companies is that their equity tends to be infrequently traded.⁵ In the U.K. context Marsh has recently suggested that

"... for the 10% least actively traded companies, the recorded prices are on average some two months out of date."⁶

Franks, Broyles and Hecht note a similar effect in the sample of companies they used in their recent study of U.K. mergers.⁷ We reproduce their Table 4 below :

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3. Stock Exchange Fact Book, December 1980.
 4. L. Fisher, "Some New Stock Market Indices", Journal of Business (January), 1966.
 5. We examine the relationships between size, marketability and infrequent trading in chapter 9.
 6. P. Marsh, "Equity Rights Issues and the Efficiency of the U.K. Stock Market", Journal of Finance (34), September 1979.
 7. J. Franks, J. Broyles, M. Hecht, "An Industry Study for the Profitability of Mergers in the United Kingdom", Journal of Finance (32), December 1977.

TABLE 3(i)

<u>London Stock Exchange</u> <u>Extent of Non-Trading</u>	
No. of days before the month end when price was recorded	No. of Prices
0	7503
1	1386
2	804
3	479
4	467
5 - 10	1559
11 - 15	631
16 - 20	352
21 - 25	312
26 - 30	180
+ 30	2253
	<hr/> 16026 <hr/>

The most obvious way round this difficulty is to allow the period over which the returns are measured to vary and to calculate the returns on a transaction to transaction basis rather than over a given time period such as a week or a month. This method requires both a knowledge of transaction price dates and a method of

weighting returns calculated over intervals of differing lengths in order to make them comparable.

Fortunately the last recorded marks in each month together with their associated transaction dates have been collected by the London Business School. As a result of their efforts transaction based returns for a large number of ITCs can be calculated.

The problem of weighting the returns is slightly more complex. As each individual return is calculated over a unique period any comparison between either returns on different ITCs or successive returns on one ITC is difficult. Our approach to this problem varies depending on the use for which we are calculating the return. Justifications for the various approaches appear before the relevant section of our empirical work.

Although we have dealt in this section with the non-trading problem in relation to the returns on individual ITCs similar problems will arise with the constituent companies in any index. There is really no way round this problem. However we suggest that as market-weighted indices are dominated by larger companies which in turn tend to be the more actively and continuously traded companies the problem of non-trading is substantially reduced.

(ii) Capital Changes : In calculating returns over any length of time capital changes will occur. Bonus issues and the bonus elements of

rights issues will directly affect the level of a mark and thus give an erroneous return for the period opening cum capital change and closing ex capital change. Here again the London Business School kindly provided details and dates of the various capital changes. Where there was obviously some doubt as to the exact date of a change these were checked against Extel cards. The method of adjustment we adopted was to alter the opening mark and make it comparable to the closing one.

- (iii) Dividends : Although we have established from equation 3(i) that dividends must be included in the computation of investment returns it remains to decide which return period should include the dividend component. There are three dates which are potential contenders - the dividend announcement date, the XD date or the date of the dividend distribution. Our choice, to add the dividend back to the return period when the security was declared XD, is based on the following argument.

The distribution of a dividend represents a reduction in a company's fund of earnings available for equity holders. As the price of a security is to a large extent determined by the dividend flows shareholders can expect it is clear that any reduction in this fund of earnings will have a direct effect on the market valuation investors are willing to place on the company. Thus any dividend distribution would be expected to have a downward effect on the price of the security concerned. It is important to note that we are concerned here with the timing of a purely mechanical price adjustment and not with the price sensitivity of any additional

information the dividend announcement itself may contain. It is clear from the above that the correct period during which to add back the dividend is the period in which the market price of the security is adjusted downwards to account for the impending distribution. To use another date would result in under-estimating the return during the period of price adjustment and over-estimating it in a subsequent period. The fact that the investor has not actually received the dividend is really irrelevant. His right to the dividend is unchanged by the price adjustment and represents a receivable due to him from the company. The date at which the price adjustments occur will be close to the date of the company's dividend announcement and will have no necessary connection with the date the company intends to make the distribution which in practice may be several weeks after the announcement.

The stock exchange has a well established practice for dealing with dividend declarations. On the opening Monday of the account period following the announcement the price of the security is adjusted downwards by the amount of the dividend and trading in the security goes XD. While certain XD bargains are allowed in the days prior to the XD date the Monday adjustment is widely accepted as the cut-off point. In order to reflect this returns over XD dates were adjusted by adding back the gross dividend declared. The XD dates were obtained from the London Business School and where necessary were checked against Extel cards.

Having fixed the relevant period for the dividend add back it should be noted that an assumption implicit in equation 3(i) is that all dividend components are added back at the end of the relevant return period. Although this is obviously an unrealistic assumption

the alternative, to adjust closing marks by an amount equivalent to any return earned on the dividend during the return interval was considered impractical.

- (iv) Taxation : The value of a return to an investor is reduced by any taxation that is payable on receipt of the component parts of the return. Consideration was given as to whether or not returns should be calculated net of some assumed shareholder marginal tax rate. We noted that several stockbrokers roughly followed this practice by adjusting returns with a factor equivalent to the basic rate for income tax. Similarly we heard from several sources that the XD adjustment described in the previous section was generally assumed to be a net of tax one although Brealey for one has suggested that in the U.K. context this would be difficult to empirically validate.⁸ Interestingly Elton and Gruber working with U.S. data assumed a net of tax XD adjustment and used it as the basis of calculating implied shareholder marginal tax rates.⁹

We rejected the temptation to adjust returns for taxation on two grounds. First of all the broad tax adjustment favoured by some stockbrokers surely leads to a false sense of accuracy. In previous chapters we noted the different tax status of several major ITC shareholders ranging from the non-taxable pension funds to the perhaps highly taxed personal investors. Similarly within groups of tax paying shareholders there will most certainly be differences in marginal tax rates. Secondly we considered whether or not to imply various tax groupings to individual ITCs based on their share-

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8. R. Brealey, "Marginal Investor Tax Rates - A Note", Investment Analyst, No. 43, December 1975.
 9. E. Elton, M. Gruber, "Marginal Stockholder Tax Rates and the Clientele Effect", Review of Economics and Statistics, pps. 68-74, 1970.

holder mix. However this approach would still suffer from intra-group differences and in addition there are the difficulties involved in establishing accurate ownership patterns for ITCs which we noted in Chapter 1.

As well as the taxation of returns actually received by ITC shareholders there is a further taxation effect peculiar to the investment returns of ITCs and unit trusts. This concerns the credit available to ITC shareholders for use against their realized ITC gains.

As we noted in the previous section the share price of an ITC security will reflect the current valuation of the earnings potentially available for distribution. However in addition to these earnings shareholders during the nineteen seventies would also have had the benefit of the gains tax credit. The return on the ITC investment would of course reflect the gains tax on the portfolio transaction but not this statutory relief available to tax paying shareholders. The possibility of adjusting for this effect was considered but rejected principally because it was impossible to accurately define those shareholders who would benefit from the relief at any point in time. The benefit received would be a function of both tax status and the ITC equity trading patterns adopted by investors.

The omission of tax from the computation of returns is of course a weakness. However on balance we felt it was advisable to reject making perhaps inaccurate adjustments in favour of calculating returns on as objective a basis as possible. (We note in passing that the

overstatement inherent in returns calculated gross of a shareholder tax effect will to some extent be offset by failure to account for the gains tax credit.)

We have now completed the main definitional points required to give equation 3(i) empirical substance. However one further comment is required. A slight adjustment to the equation is required when calculating returns on stock market indices. The dividend component on an index is invariably published in terms of dividend yield. Effectively the most recent annual dividends are weighted by current market prices thus making it impractical to isolate the dividends allocable to a particular return period. We used the following approximation as an estimate of the monthly dividend component.

$$D_{it} = (Dy_{it} \times I_{it})/1200 \quad 3(ii)$$

where;

D_{it} = Dividend component during period l

Dy_{it} = Yield at time t

I_{it} = Index value at time t .

As we noted above the investment returns on individual ITCs were calculated on a transaction to transaction basis. In order to observe index returns over the same number of elapsed days as ITC returns index values were matched with individual ITC transaction dates.¹⁰ It was possible to complete this matching process for both the FTA-All Share Index and the FTA-ITC index.¹¹

10. The programming required

(a) to calculate the number of elapsed trading days, and
 (b) to align up the index values with the differing ITC equity transaction dates was completed by Dr. Jan Kwiatkowski.

11. The FTA-AS and ITC indices are market-weighted indices of the form

$$\frac{N_t P_t}{N_o P_o}$$

/continued

2. Some Initial Observations : We detail the average and individual annual portfolio and equity returns for the full data base of ITCs in Tables 3(ii) and 3(iii), pages 1/3 to 2/3. The returns on the FTA-AS index are shown for comparative purposes.

The following computational points should be noted with regard to the undernoted Tables.

$$R_{iy} = \left[\text{Antilog} \left[\sum_{t=1}^{12} \text{Log} (R_{it} + 1) \right] - 1 \right] 100$$

where;

R_{iy} = Simple return equivalent for the year

R_{it} = Return per equation 3(i) in the case of equity returns. The index returns are calculated as per equations 3(i) and 3(ii).

In addition to the annual simple return equivalent of the cumulative monthly returns similar returns are also reported for the full 118 month period. The 118 month returns were calculated as follows :

$$R_{ic} = \left[\text{Antilog} \left[\sum_{t=1}^{118} \text{Log} (R_{it} + 1) \right] - 1 \right] 100$$

where;

R_{ic} = Simple return equivalent for the 118 months

R_{it} = As before.

/ where;

N_t = Number of shares currently in issue

P_t = Current price per share

N_o = Number of shares at base date

P_o = Price per share at base date

Linking procedures to account for scrip issues, bonus issues and rights issues allow the indices to be used as a measure of capital performance relative to the base date of April 10 1962. The coverage of these two indices is substantial. Indeed each covers more than 60% by market value and 30% by number of their respective parent populations.

TABLE 3(ii)

<u>Investment Trust Companies</u> <u>Average (Total) Equity Returns</u> Annual %				
Period	ITC Equity			FTA - All Share
	Average	Minimum	Maximum	
10 mths to 12/71	34.384	15.235	75.587	48.502
Year : 1972	14.813	-3.965	44.851	17.312
1973	-36.171	-49.047	-13.403	-30.385
1974	-44.391	-84.441	-10.061	-49.363
1965	131.829	74.452	189.746	150.262
1976	-3.064	-23.904	42.520	1.432
1977	44.949	14.278	82.129	50.082
1978	4.781	-7.192	38.428	9.135
1979	0.622	-14.324	43.554	8.931
1980	58.309	21.643	93.929	33.982
118 mths to 12/80	182.872	39.900	377.759	260.342

We would draw attention to the following points of interest from Tables 3(ii) and 3(iii).

- (i) As we might expect the average ITC returns closely mirror those of the market.
- (ii) The cumulative return on the index over the full period was considerably greater than the average achieved by ITCs although nine ITCs did achieve higher returns than the index.

TABLE 3(iii) 1/4

Investment Trust Companies											
Cumulative Total Returns											
1971 - 1980											
Trust	10 mths to 12/71	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
Aberdeen Trust	49.379	15.322	-34.827	-40.936	151.175	-8.400	40.670	-0.674	2.189	63.355	260.680
Alliance Investment	22.124	15.424	-49.047	-47.142	147.141	-5.508	43.213	16.629	3.930	71.083	163.305
Alliance Trust	33.848	6.733	-33.255	-40.211	123.200	-1.681	31.112	-1.556	-5.474	45.981	120.465
American Trust	29.279	17.367	-43.189	-54.292	126.597	-2.397	43.514	-4.424	0.287	66.551	99.644
Anglo-American	30.149	18.888	-33.546	-40.297	124.351	-3.701	22.119	1.921	-6.412	51.836	113.563
Anglo-Scottish	40.019	-3.965	-41.667	-58.852	129.988	-12.214	55.816	6.408	2.032	63.429	123.037
Ashdown	32.483	72.059	-34.999	-44.175	130.786	-12.206	57.053	-4.236	1.805	74.002	149.022
Atlantic Assets	29.584	6.785	-41.129	-84.441	136.558	42.520	74.032	8.448	37.869	93.929	247.986
Atlas Elec & Gen.	36.967	12.247	-34.263	-50.876	186.942	-3.434	60.198	3.726	-2.842	54.586	227.198
Bankers	37.792	40.290	-36.820	-29.492	104.168	-7.063	52.671	17.910	-3.552	56.692	255.659
Berry	19.888	11.991	-45.022	-62.473	111.174	11.142	51.359	27.566	1.409	98.484	216.520
Bishopgate	21.329	8.929	-35.243	-53.991	151.676	-18.395	80.181	9.116	3.869	60.162	171.943
Border & Southern	22.585	11.689	-39.154	-41.960	112.945	-3.287	50.202	0.232	-0.357	53.803	124.163
Brit. Amer & Gen	41.117	6.700	-41.856	-27.321	94.414	-3.277	45.982	-1.194	2.435	40.538	160.067
British Assets	28.977	8.392	-37.577	-65.378	155.945	18.265	34.436	0.459	11.818	44.272	96.144
Brit Investment	31.480	-2.145	-33.652	-49.658	113.688	-4.034	31.888	4.780	-0.808	39.744	70.018
Broadstore	25.572	17.709	-27.194	-43.684	139.413	-6.118	52.229	0.077	-2.952	62.162	171.502
Brunner	49.753	13.619	-45.518	-40.694	127.174	-2.797	64.343	4.636	0.526	60.511	255.452
Capital & National	39.997	23.294	-47.164	-30.980	119.259	3.848	45.045	1.868	17.204	52.583	199.333
Cardinal	25.644	18.445	-35.326	-51.173	130.766	-9.611	53.827	4.197	4.998	74.254	234.025
Cedar	25.245	13.375	-39.476	-35.654	114.822	-4.713	41.703	3.049	-1.047	45.077	181.608
Charter Trust	40.930	13.116	-44.656	-45.448	134.333	0.897	39.399	4.465	14.307	52.099	149.981
Claverhouse	42.592	30.247	-35.939	-47.600	109.897	3.650	77.065	4.419	-1.212	54.362	284.280
CLRP	28.206	-3.054	-22.080	-42.998	111.133	-20.563	51.309	11.718	2.249	54.856	221.669
Contin. & Industrial	30.799	8.422	-38.755	-43.821	177.459	-6.487	43.156	-3.722	-1.114	62.247	158.753

TABLE 3(iii) 2/4

Trust	10 mths to 12/71	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
Continental Union	31.199	8.422	-34.747	-41.403	145.685	-5.863	51.111	0.532	-1.114	58.097	198.754
Drayton Commercial	19.925	20.831	-31.845	-24.536	96.657	-9.162	42.715	-5.516	-9.260	60.374	161.251
Drayton Consolidated	24.123	19.808	-35.456	-29.157	113.431	-9.244	35.804	-2.452	-10.470	60.482	150.965
Drayton Premier	23.205	14.965	-32.078	-16.577	99.760	-5.826	34.936	-1.514	-14.324	58.753	172.904
Edinburgh Investment	48.035	9.337	-39.089	-34.274	115.484	-0.439	44.137	-1.835	14.360	82.178	309.797
Electric & General	44.113	20.132	-38.944	-63.277	105.151	6.500	19.404	13.898	-3.110	62.936	82.087
English & International	34.967	21.519	-45.929	-23.887	108.467	-6.396	35.935	-1.751	2.450	61.864	191.721
English & New York	36.153	13.358	-41.772	-34.890	146.194	-6.265	44.995	-0.770	-2.365	36.956	159.789
English & Scottish	42.095	18.069	-37.951	-40.416	93.477	-7.293	40.248	0.051	9.319	98.031	237.966
Estates Duties	33.756	4.189	-16.058	-55.520	183.085	-23.904	77.066	38.231	-8/838	21.643	208.637
First Scottish American	50.898	12.528	-39.639	-50.996	154.558	-3.209	33.675	-0.858	-7.980	51.078	137.878
Foreign & Colonial	31.044	17.574	-39.190	-47.152	132.026	-4.469	26.916	8.320	-1.044	67.994	150.822
General Consolidated	29.462	15.427	-38.745	-45.579	152.911	12.241	39.861	8.383	5.718	54.380	249.845
General Funds	17.365	44.851	-46.084	-50.119	186.764	-6.522	49.728	29.841	-1.681	72.226	303.458
General Investors	29.557	28.626	-37.814	-54.396	142.874	-10.687	49.339	6.165	10.290	80.861	224.201
General Scottish	39.744	16.549	-28.333	-32.013	70.563	7.131	34.943	7.165	-2.965	52.888	211.036
Glasgow Stockholders	36.935	18.392	-33.574	-49.034	161.602	-3.869	36.448	-7.192	8.825	63.733	211.443
Globe	41.996	1.071	-32.209	-38.985	125.585	-6.781	73.399	3.962	11.073	28.966	222.354
Great Northern	42.680	12.149	-31.634	-47.240	134.619	-1.602	46.545	-3.757	-0.657	52.100	183.963
Guardian	39.884	4.927	-32/646	-52.734	174.982	-5.958	53.659	0.441	-1.971	54.315	182.109
Hambros	15.236	15.094	-38.558	-49.851	84.343	13.855	50.574	15.767	4.457	72.758	169.807
Philip Hill	46.849	8.650	-34.368	054.712	174.006	0.838	62.911	-0.979	5.978	50.748	252.608
Industrial & General	33.327	4.282	-20.674	-44.842	137.640	-2.151	43.948	5.572	6.228	52.416	248.057
International	37.039	15.391	-28.581	-45.799	128.668	-3.223	53.039	1.576	-12.174	58.603	195.315

TABLE 3(iii) 3/4

Trust	10 mths to 12/71	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
Investors' Capital	59.487	4.357	-41.929	-50.340	183.312	-3.930	22.868	3.586	-2.898	57.568	154.398
Keystone	33.416	17.153	-45.010	-43.742	172.133	-14.593	82.129	5.718	9.899	54.140	266.560
Lakeview	25.847	2.474	-34.969	-46.064	124.688	-2.852	40.182	1.058	2.990	63.989	136.279
London & Holyrood	36.262	23.788	-43.614	-30.253	117.359	0.914	39.196	4.910	-7.329	58.417	211.937
London & Lomond	25.548	9.548	-36.473	-61.309	184.931	-8.120	53.280	12.216	-3.807	55.144	127.174
London & Montrose	30.401	27.231	-36.226	-43.135	142.376	-1.753	37.322	5.782	-6.675	55.352	201.746
London Provincial	33.639	22.910	-29.982	-37.592	119.581	4.562	30.503	4.867	-5.006	47.851	216.747
London Trust	34.259	11.811	-31.779	-52.574	159.977	-7.550	67.154	12.720	19.723	46.849	286.705
Mercantile	32.765	6.809	-26.576	-53.885	65.242	1.281	47.526	4.816	20.891	49.606	124.730
Merchants	45.156	10.847	-36.809	-32.571	117.392	6.121	36.022	2.955	-4.223	59.012	237.333
Monks	33.418	2.680	-39.258	-40.121	128.790	2.287	31.594	-3.386	5.088	57.857	149.618
Murray Caledonian	29.605	18.426	-36.976	-56.081	129.631	-4.288	30.160	9.411	-11.582	62.878	91.493
Murray Clydesdale	30.930	16.110	-33.728	-51.943	122.301	-1.042	25.620	8.532	-11.006	55.162	100.516
Murray Northern	31.363	22.187	-42.014	-52.763	124.771	-6.601	27.826	10.218	-8.465	55.976	85.655
Murray Western	31.861	20.329	-44.947	-56.424	142.372	-0.679	28.104	17.248	-14.272	58.079	86.262
1928	24.048	17.711	-35.732	-34.030	125.595	2.231	42.736	6.898	-7.989	50.973	207.166
North Atlantic Secs.	35.313	2.256	-34.793	-36.635	111.647	-8.922	32.078	1.746	-8.609	57.206	112.766
Northern American	47.836	13.457	-36.327	-52.291	163.922	-4.235	39.144	-0.511	-8.786	55.457	152.788
Outwich	51.382	39.202	-22.711	-52.111	136.407	-15.349	79.011	8.528	-1.593	60.101	377.759
Pentland	42.377	18.470	-39.971	-46.939	152.364	0.132	43.045	-0.573	-4.398	55.278	186.643
Raeburn	37.854	8.379	-39.444	-38.705	138.589	-8.678	32.005	0.023	-6.336	57.357	135.139
Romney	31.614	8.961	-37.339	-42.468	128.614	0.234	30.295	2.666	-6.784	57.538	132.717
RIT	51.368	27.150	-41.302	-10.061	13.583	-25.622	80.940	11.374	43.554	41.551	251.501
St. Andrew	28.460	14.893	-33.793	-43.904	133.973	-6.020	40.974	0.904	-4.686	59.784	160.003

TABLE 3(iii) 4/4

Trust	10 mths to 12/71	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
Scottish American	41.026	30.145	-28.936	-66.679	141.593	6.399	55.105	-9.212	17.559	58.839	193.753
Scottish Eastern	34.776	-0.619	-33.670	-43.596	139.600	-1.209	30.944	6.294	-6.334	47.923	128.743
Scottish Investment	35.859	5.248	-37.678	-47.779	123.578	0.788	26.168	4.519	-4.301	50.721	99.464
Scottish Mortgage	35.268	3.266	-39.411	-42.382	126.021	4.445	22.065	-1.534	-1.517	53.546	109.231
Scottish National	46.073	21.211	-39.183	-49.821	156.806	-3.134	38.149	-2.895	1.003	71.511	215.716
Scottish Northern	25.096	19.047	-40.363	-55.317	114.612	2.417	43.513	4.601	8.319	65.368	134.545
Scottish Ontario	31.160	20.998	-36.422	-30.981	115.257	-2.408	34.535	1.862	-8.235	50.046	73.045
Scottish United	30.956	23.774	-28.919	-42.361	112.755	3.082	14.278	12.339	-22.672	96.708	184.405
Second Alliance	33.477	9.501	-73.172	-41.916	135.627	-5.887	38.058	-1.003	38.478	46.409	39.900
Securities	49.904	13.912	-43.531	-34.354	129.776	1.624	35.507	1.220	-7.196	45.762	174.246
Sphere	44.886	3.332	-42.092	-42.233	141.817	6.089	58.076	2.071	-5.696	58.098	173.594
Sterling	31.839	9.900	-37.625	-41.470	133.574	-3.696	40.429	0.074	-4.859	50.937	140.132
Stockholders	23.497	9.912	-40.293	-47.432	123.045	-2.773	34.924	4.963	-3.387	76.492	123.109
Throgmorton	75.587	4.580	-36.024	-52.141	118.412	3.555	37.531	16.134	12.763	37.150	369.676
Trans-Ocean	29.032	11.542	-36.082	-51.895	168.203	-9.877	45.843	7.607	-9.296	64.660	150.731
Tribune	18.780	30.376	-13.405	-46.182	145.014	3.012	8.161	-2.142	2.467	53.187	202.640
Trust Union	34.588	3.410	-29.631	-46.058	151.766	-10.976	48.924	6.468	0.108	56.659	200.018
Trustees Corporation	39.759	10.988	-36.238	-45.171	141.429	-9.151	54.670	6.838	9.131	60.917	245.155
UBS	34.675	26.757	-33.890	-35.963	135.047	-2.990	40.872	0.234	-1.025	48.797	242.678
US Debenture	23.050	26.262	-33.535	-50.924	189.746	-15.947	59.422	-2.114	-7.599	74.036	209.721
US & General	36.721	1.895	-34.170	-38.938	132.857	4.036	31.670	-0.737	-2.907	47.565	154.037
Winterbottom	32.585	17.350	-19.877	-63.654	146.287	-6.679	36.758	18.343	-7.137	70.795	167.320
Witan	42.558	8.841	-37.501	-45.919	98.377	-4.773	33.104	7.190	-5.367	66.013	122.064
Yeoman	39.287	13.698	-38.488	-44.608	129.643	-11.712	73.197	12.657	4.634	61.552	260.834

- (iii) There is considerable uniformity in the direction of the year to year returns between the individual ITCs. In particular note the decline from 1971 to the end of 1974, recovery in 1975, 1977 and 1980 with no obvious trend identifiable during the remaining intervening years.

3. Distributional Characteristics : As a pre-requisite to any empirical work it is useful to know the ditributional characteristics of the data being used. This is particularly so if the empirical conclusions are to be supported by statistical inference. Ideally we would like any distribution to closely resemble a stationary normal. In practice we would not expect an empirical distribution to exactly mirror the theoretical model. On the other hand we would be unwise to assume a particular distributional form in the face of strong evidence to the contrary. Our objective then must be to establish the reasonableness of assumptions.

The distributional characteristics of equity returns have been the subject of considerable debate. There are very broadly three strands to the controversy.

- (i) Return Stationari^y
- (ii) The Normality Assumption
- (iii) The Stable non-Normal Assumption.

We deal with each of these in turn.

- (i) Return Stationarity : The question is whether the return generating process is relatively stationary through time or whether it leads to changing distributional parameters. The danger inherent in the latter position is that it implies we are dealing with several populations each with its own parameter set rather than with a single population. Any results based on sampling procedures applied across these different populations would require to be interpreted with care.

In the U.K. context various authors have suggested that long term trends in variability can be detected and they have implied that these are primarily related to the increasing institutionalisation of the stock exchange.^{12,13} The argument runs that the increased concentration of trading power leads to large block trading which is reflected in increased return volatility. Given the established informational efficiency of the stock market such arguments would appear to require very substantial empirical verification. Indeed Brealey et al working with a long time series of U.K. monthly data (1925-1977) have suggested that periods of increased volatility are more closely related to periods of economic uncertainty than to any underlying trend through time. We note in particular their conclusion :

"The principal peaks of volatility occurred in the periods 1931-32, 1939-40 and 1974-75. We conclude with a question. If you were asked to think of any events in those periods that might have caused unusual market perturbations, would the first thing to come into your head be an increase in institutional ownership?"¹⁴

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12. R. Dobbins, M. Greenwood, "Institutional Shareholdings and Equity Market Stability", *Journal of Business Finance & Accounting*, 1975, pp. 257-261.
 13. C. Ward, A. Saunders, "Some Disturbing Developments in the U.K. Stock Market", *Investment Analyst*, 49, 1977, pp. 5-8.
 14. R. Brealey, J. Byrne, E. Dimson, "The Variability of Market Returns" *Investment Analyst*, 52, 1978, pp. 19-23.

A similar conclusion relating periods of economic uncertainty to periods of increased return volatility has been noted in the U.S. context.¹⁵

In order to provide some insight into the stationarity of ITC returns the following test was undertaken. Daily observations on the FTA-AS and FTA-ITC indices were collected for the period of February 2 1971 to December 31 1980. In total 2407 observations were recorded for each index.¹⁶ Daily log returns were calculated as per equations 3(i) and 3(ii).¹⁷

When the daily returns on the two indices were plotted out in time series format it was visually apparent that the series included periods of differing return variance. In order to determine the extent of non-stationarity the returns were divided on a "moving window" principle into groups of 100 observations each - group 1 comprising observations 1 - 100, group 2 comprising observations 2 - 101 and so on. The variance of each group was then calculated and the time series of variances plotted out.

The observed result was that the ten year period could easily be divided on a visual basis into three separate periods of different but reasonably stable variance. As the graphs cover several yards of computer print out we do not reproduce them here. However the key distinguishing characteristics of the three periods are shown in Table 3(iv).

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15. R. Officer, "A Time Series Examination of the Market Factor of the New York Stock Exchange". PhD dissertation, University of Chicago. (Quoted in E. Fama, "Foundation of Finance, Oxford, 1977).
 16. The data was collected from the daily client service sheets of Wood Mackenzie & Co.
 17. Observations were taken on each trading day during the period.

TABLE 3(iv)

<u>Investment Returns</u> <u>Sub-Periods of Stable Variance</u> <u>FTA-AS and FTA-ITC Indices</u> <u>Daily Returns</u> 1971 - 1980 (%)								
Description	FTA - All Share				FTA - ITC			
	Full	Period 1	Period 2	Period 3	Full	Period 1	Period 2	Period 3
Mean (%)	0.053	0.048	-0.380	0.081	0.041	0.022	-0.027	0.068
Standard Deviation (%)	1.468	0.840	2.053	1.416	1.257	0.941	1.686	1.084
Period Covered								
From	2/ 2/71	2/ 2/71	3/ 1/74	17/ 3/75	2/ 2/71	2/ 2/71	3/ 1/74	17/ 3/75
To	31/12/80	16/11/73	3/12/74	31/12/80	31/12/80	16/11/73	3/12/74	31/12/80
No. of Observations	2406	670	201	1442	2406	670	201	1442

Note : 1. The means and standard deviations are shown in terms of average daily simple returns.

The main characteristics of the sub-periods are as follows :

- (i) The three sub-periods cover the same time span for both indices.
- (ii) The trend of means through the three periods - a negative period 2 surrounded by an intermediate period 1 and a high period 3 - was the same for both indices.
- (iii) The trend of standard deviation through the three periods - an initial low followed by a middle high and an intermediate final - was the same for both indices.
- (iv) The inter-period differences in standard deviation were substantial ranging from a minimum of 17% (FTA-ITC period 1 to period 3) to a maximum of 175% (FTA-All Share period 1 to period 2).
- (v) Only 93 observations were lost in isolating the three sub-periods 26 - between period 1 and period 2 and 67 between period 2 and period 3.

The first transition period between 17/11/73 and 2/1/74 covers the steepest monthly decline in share prices of the decade and led into the bear market of 1974 which we noted in chapter 1 did not bottom out until 13/12/74. The duration of this stock market decline is effectively covered by our period 2. We record negative returns and the highest standard deviations in this period.

The second transition period running from 4/12/74 to 16/3/75 covers the market turn-around and the largest monthly rise of the decade. Thereafter the return generating process is relatively stable although at a significantly higher level of standard deviation than we recorded in period 1 before the gyrations of the 1973-1975 period.

These results suggest that periods of different return variance can be triggered off by substantial market movements. To this extent there appears to be elements of non-stationarity in the return process that may well be slightly more serious than the occasional "shock" of increased volatility reported by Brealey et al. However as relatively long periods of stationarity can be identified the assumption is perhaps not completely redundant. Nevertheless our reported results do suggest that care should be taken in applying the assumption.

- (ii) The Normality Assumption : The usefulness of the normality assumption lies in the relative ease with which the assumption allows both statistical inference to be established and the investment decision process to be proxied. There is little conclusive evidence in either the U.K. or the U.S. context that equity returns precisely follow a normal distribution.^{18, 19} However it is maintained by most authors that the distributions are either adequately close to the normal or in fact belong to the same family of distributions as the normal namely the stable Pareto-Levy group. Unfortunately the normal distribution is the only member of this family to have a finite variance.²⁰ If a finite variance cannot be assumed for the underlying distribution the Central Limit Theorem will not hold and the use of traditional methods of statistical inference must be questioned.²¹

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18. E. Fama, "The Behaviour of Stock Market Prices", Journal of Business, 1965, pp. 34 - 105.
 19. R. Brealey, "The Distribution and Independence of Successive Rates of Return from the British Equity Market". Journal of Business Finance, 1970.
 20. R. Brealey, "The Distribution and Independence of Successive Rates of Return from the British Equity Market". Journal of Business Finance, 1970, p.30.
 21. T. Wonnacott and R. Wonnacott, "Introductory Statistics", Wiley, 1972, p. 125.

In order to test the normality assumption the following work was undertaken. The daily returns used in the stationarity test were recoded into groups of half standard deviations from their respective means. In addition to using the full sample range the sub-periods of relatively stationary variance were similarly recoded. This had the useful effect of both removing the unstable transition periods and allowing an assessment of the normality assumption at different levels of variance. The results are documented in Tables 3(v) and 3(vi).

The main conclusions from Tables 3(v) and 3(vi) can be summarised as follows :

- (i) There is a strong similarity between the return distributions on the full samples and on each of the sub-periods. This result holds for both indices.
- (ii) While there is evidence of slight positive skewness all the distributions are on the whole reasonably symmetrical.²²
- (iii) The computed χ^2 value suggests non-normality for all samples bar those of period 2.
- (iv) In comparison with the theoretical normal distribution the actual distributions exhibit higher peaks, lower middle ranges and fatter tails.

This last conclusion suggesting that the returns are leptokurtic relative to the normal would be in line with those authors noted above who have identified return distributions as belonging to the stable Pareto-Levy group.

22. Note that the returns are in log form while it itself will tend to reduce any positive skewness evident in simple return distributions.

TABLE 3(v)

Actual Distributions Compared with Normal								
FTA-All Share, FTA-ITC, S and P Composite								
(Daily Returns)								
Standard Deviations from the Mean	FTA-All Share				FTA-ITC			
	Full Sample	Period 1	Period 2	Period 3	Full Sample	Period 1	Period 2	Period 3
3	+	+	+	+	+	+	+	+
3.0 - 2.5	-	+	-	-	-	+	+	-
2.5 - 2.0	-	-	-	-	-	-	+	-
2.0 - 1.5	-	-	-	-	-	-	-	-
1.5 - 1.0	-	-	-	-	-	-	-	-
1.0 - 0.5	+	-	-	+	-	-	-	-
0.5 - 0.0	+	+	+	+	+	+	+	+
0.0 - 0.5	+	+	+	+	+	+	+	+
0.5 - 1.0	+	-	+	+	-	-	-	-
1.0 - 1.5	-	+	-	-	-	+	+	-
1.5 - 2.0	-	-	-	-	-	-	-	-
2.0 - 2.5	-	-	-	-	-	-	-	+
2.5 - 3.0	-	+	-	-	-	-	-	-
3	+	+	-	+	+	+	+	+

Notes : 1. + More observations than expected under the normal
 - Less observations than expected under the normal

TABLE 3(vi),

Actual Distribution of Observations Compared with the Expected Normal Distributions									
FTA-All Share, FTA-ITC									
(Daily Returns)									
(%)									
Standard Deviations from the Mean	Normal	FTA - All Share				FTA - ITC			
		Full Sample	Period 1	Period 2	Period 3	Full Sample	Period 1	Period 2	Period 3
3	0.13	0.47	0.92	1.00	0.21	0.75	0.89	0.50	0.35
3.0	49.87	48.81	47.72	44.77	48.89	49.40	47.47	44.78	50.41
2.5	49.38	48.19	46.72	44.77	48.68	48.77	46.42	44.28	49.99
2.0	47.72	47.57	45.38	44.27	48.06	48.11	44.78	41.79	49.02
1.5	43.32	45.61	43.44	43.27	45.77	45.61	42.54	40.30	46.18
1.0	34.13	40.46	35.08	35.82	40.22	39.33	36.27	34.33	38.14
0.5	19.15	25.28	20.45	21.89	23.72	25.57	22.99	22.39	24.41
0.5	19.15	26.69	22.24	27.35	25.45	26.36	25.07	27.86	23.51
1.0	34.13	42.95	36.56	43.77	42.65	39.33	38.88	42.29	37.59
1.5	43.32	47.53	46.42	50.74	47.99	45.23	45.37	53.24	44.87
2.0	47.72	49.11	49.41	53.73	49.86	47.65	49.25	53.34	47.85
2.5	49.38	49.56	50.60	54.23	50.48	48.36	51.19	53.84	48.89
3.0	49.87	49.97	51.20	54.23	50.48	49.06	51.19	54.30	49.24
3	0.13	0.75	0.16	0.00	0.42	0.79	0.46	0.42	0.90
χ^2 Value	-	412.65	21.62	17.50	152.52	384.62	59.67	21.85	79.85
Number of Observations	-	2406	670	201	1442	2406	670	201	1442

Notes : 1. χ^2 values were computed using the observations that fell in the half standard deviation groupings shown in Table 3(v). (χ^2 .05 11 df = 19.67).

(iii) The Stable Non-Normal Assumption : If the return distributions follow the more general stable Pareto-Levy model rather than the more specific normal distribution as was suggested above we would expect to observe a considerable measure of stability in the distributions. By stability we imply that the distributional form (i.e. leptokurtic relative to the normal) will be broadly the same whether we use daily, weekly or monthly observations. Effectively the distribution will be stable even although we use sums of the daily continuously compounded returns. There is little U.K. evidence on this additive property of the return distributions. In the U.S. Fama notes several studies indicating that this property is not present in U.S. returns.²³ This would be extremely unfortunate but for the observation that monthly returns in fact appear to be more normal than daily ones. Thus there is support for rejecting the stable Pareto-Levy position and returning to the normality assumption.

The 2406 observations were reduced to 118 by selecting approximately every twentieth return. This reduction in sample size effectively rules out the possibility of sub-dividing the total period into periods of stationary variance. To this extent our results will be less secure. The characteristics of the monthly distributions are shown in Tables 3(vii) and 3(viii). Those Tables correspond to Tables 3(v) and 3(vi) for the daily returns.

Looking first at Table 3(vii) the form of the monthly distribution is broadly similar to that of the daily observations. However from the more detailed Table 3(viii) it is clear that for both indices the monthly returns are slightly closer to the normal when taken over the two central groups together and comprising one standard deviation on

23. E. Fama, "Foundations of Finance", Oxford 1977, p.38.

TABLE 3(vii)

<u>Investment Returns</u> <u>Actual Distributions Compared with Normal</u> <u>FTA-All Share and FTA-ITC Indices</u> <u>Monthly Returns</u> 1971-1980		
Standard Deviations from the Mean	FTA - All Share	FTA - ITC
3	-	-
3 - 2	-	+
2 - 1	-	-
1 - 0	+	-
0 - 1	+	+
1 - 2	-	-
2 - 3	-	-
3	+	-

Notes : 1. + More observations than expected under the normal

- Less observations than expected under the normal.

either side of the mean. However if anything the reduced height of the central position is compensated by increased positive skewness. At the extremes of the range the monthly distributions are closer to the normal than the daily. There is then slight evidence that the monthly distributions are in fact marginally more normal than the daily but that like the daily they suffer from an element of positive skewness. To the extent

TABLE 3(viii)

<u>Investment Returns</u> <u>Actual Distributions of Observations Compared with the Expected</u> <u>Normal Distributions : FTA-All Share and FTA-ITC Indices</u> <u>Monthly Returns</u> 1971-1980 (%)			
Standard Deviation from the Mean	Normal	FTA - All Share	FTA - ITC
3	0.13	- (0.47)	- (0.75)
3	49.87	48.20 (48.81)	45.66 (49.40)
2	47.72	46.12 (47.57)	42.37 (48.11)
1	34.13	34.85 (40.46)	29.67 (39.33)
1	34.13	44.17 (42.95)	44.92 (39.33)
2	47.72	51.70 (49.11)	53.38 (47.65)
3	49.87	51.70 (49.97)	54.24 (49.06)
3	0.13	0.10 (0.75)	0.10 (0.79)
χ^2 Value	-	14.8	14.03
No. of observations	-	118	118

- Notes :
1. The χ^2 values were computed on the number of observations that fell within the standard deviation groupings shown in Table 3(viii). (χ^2 5df = 11.1)
0.05
 2. To facilitate comparisons the equivalent daily full sample data are shown in parenthesis.

that this conclusion is valid we would be rejecting the stable Pareto-Levy assumption and supporting the normality assumption for monthly observed returns. Finally we note that the X^2 statistics indicate non-normality.

Whether or not the normality assumption is valid is at the end a question of judgement. Certainly the distributions reviewed above indicate broad similarities with the normal. However there are undoubtedly elements of leptokurtosis and skewness which would tend to weaken the normality conclusion. As with stationarity the cost of rejection is high both in terms of statistical inference and financial theory. In view of this we suggest that complete rejection on the basis of the above results is not justified.

4. Time Series Dependence : Knowledge of the time series behaviour of returns is of particular importance in finance. We noted in Chapter 2 that a large section of theoretical and empirical work is concerned with the efficiency of stock markets and that a substantial proportion of this work is centred on testing weak form efficiency through analysing the time series dependence of returns. Indeed the adequacy of any performance measure depends to a large extent on at least weak form efficiency. It is therefore necessary to establish some minimum level of market efficiency upon which to base the results of succeeding chapters. We do this by examining the time series dependence of returns on the FTA-AS and FTA-ITC indices and a sample of ITCs.

We start by considering the conditions that will lead to a meaningful

test for time series dependency. Our task is made considerably easier given that returns can be assumed to follow normal distributions. If this were not the case then either more complex distributional forms or the weaker non-parametric approach would have to support any statistical inference. However an assumption of normality alone is insufficient. It is possible for example that an underlying trend in the mean of successive normal distributions would induce an observable time series dependency. We make an assumption that successive distributions are both normal and stationary. In the light of the results in the previous section some care is required with these assumptions thus the presentation of our results is in terms of both full and sub-period samples.

The assumption of stationarity has a direct financial implication. We noted in Chapter 2 that any test of the EMH requires an assumption as to how the market sets equilibrium or market clearing prices. As we are assuming that the expected means of successive distributions are identical we are implying a market mechanism that sets prices such that the expected returns are constant. If this model is accurate then weak form market efficiency implies that it is not possible to use the information contained in past returns to estimate expected returns that are both different from those constant returns achieved when the market is in equilibrium and are consistently and accurately realized. The use of the word "consistently" is important. We are dealing with a distribution of possible return values any one of which could be actually realized. Our limitation is that on average the realized return will be constant.

More formally our model is as follows :

$$\tilde{R}_{it} = E(\tilde{R}_i) + \tilde{e}_{it} \quad 3(iii)$$

where;

\tilde{R}_{it} = Realized return on index i during period t .

$E(\tilde{R}_i)$ = Expected return on index i

\tilde{e}_{it} = Residual error term.

If our model of equilibrium pricing is accurate then ;

$$E(\tilde{e}_{it}) = 0$$

Similarly if there is no time series dependency then;

$$\text{Cov}(\tilde{e}_{it}, \tilde{e}_{it-n}) = 0$$

A violation of this second condition could take many forms. We are concerned with testing only for linear dependency.

$$\text{i.e. } \tilde{e}_{it} = \rho \tilde{e}_{it-n} + \mu_t \quad 3(iv)$$

In this model first order dependency would be identified by a significantly non-zero ρ . It is of course possible that the linear dependency is of a more complex form than the relatively simple first order process.

To assess whether or not the extent of any dependency justifies further work in terms of determining the nature of the underlying dependency a first step is to calculate serial correlation coefficients

for a variety of lags. We present our results dealing first of all with the two market indices and then with the individual ITCs.

- (i) FTA-AS and FTA-ITCs : The samples used in this test are the same as those used to examine the distributional characteristics of the returns. It was however necessary to make one adjustment to the index returns described in equations 3(i) and 3(ii). As the dividend component of the total index returns were derived from the reported daily yields we would expect some time series dependency between the yields reported on successive periods of less than twelve months. This dependency would take the form of a moving average. As our return periods are daily it seemed prudent to use log price relatives rather than total returns.²⁴

Table 3(ix) describes the serial correlation coefficients on the two indices for lags of 1 to 30 days. The results are shown for both the full samples and the sub-periods identified above as periods of reasonably stable variance.

The main results from Table 3(ix) can be summarised as follows:

24. It is interesting to note the possible effects that this would have on the distributional form of the returns. As corporate dividend levels tend to be relatively stable the removal of a positive "constant" from each total return would have the effect of shifting the distribution to the left rather than altering its shape. In fact the distributional results of the previous section were partially reworked using log price relatives with no significant differences being noted.

TABLE 3(ix)

Investment Returns								
First Order Serial Correlation Coefficients for Daily Log. Price Relatives								
FTA-All Share and FTA-ITC Indices								
Lags Days 1 - 30	FTA - All Share				FTA - ITC			
	Full Sample	Period 1	Period 2	Period 3	Full Sample	Period 1	Period 2	Period 3
1	0.06	0.27	0.11	-0.06	0.27	0.33	0.15	0.26
2	0.00	-0.01	-0.02	0.01	0.08	0.02	-0.02	0.12
3	0.02	-0.04	-0.08	0.02	0.10	0.02	0.06	0.11
4	0.05	0.03	0.02	-0.02	0.09	0.07	0.04	0.07
5	0.01	0.03	-0.01	-0.01	0.07	0.09	0.05	0.04
6	0.01	0.02	-0.03	-0.04	0.06	0.02	0.00	0.01
7	-0.01	0.03	-0.01	0.00	0.01	0.08	-0.07	0.00
8	0.02	0.04	0.01	0.00	0.05	0.99	-0.04	0.05
9	0.09	0.04	0.07	0.04	0.08	0.05	0.01	0.02
10	0.06	0.04	0.02	0.01	0.08	-0.01	0.08	0.04
11	-0.02	0.02	0.01	0.00	-0.01	-0.06	-0.05	0.02
12	-0.01	0.00	-0.05	-0.02	-0.02	-0.04	-0.07	-0.01
13	0.04	0.09	-0.09	0.01	0.06	0.04	-0.03	0.03
14	0.05	0.05	-0.07	0.05	0.02	0.08	-0.08	-0.00
15	-0.01	0.01	0.01	-0.03	-0.01	0.02	-0.09	-0.03
16	-0.01	0.01	-0.01	-0.01	-0.02	-0.03	-0.06	-0.02
17	0.04	0.07	0.06	0.04	0.03	0.02	-0.05	0.01
18	0.03	0.08	-0.09	0.03	0.01	0.07	-0.02	0.02
19	0.03	0.02	-0.06	-0.01	-0.01	0.07	-0.08	-0.03
20	-0.02	-0.01	-0.06	-0.02	-0.02	0.04	-0.11	-0.02
21	-0.02	-0.01	-0.02	-0.01	0.00	0.01	-0.15	0.01
22	0.02	-0.04	-0.14	0.01	0.03	-0.02	0.01	-0.01
23	0.02	-0.04	-0.02	0.01	-0.01	0.01	-0.04	-0.04
24	-0.02	-0.04	-0.03	-0.01	-0.02	0.01	0.01	-0.04
25	0.01	-0.01	0.05	-0.01	-0.03	-0.03	0.00	-0.03
26	0.00	0.03	0.10	-0.04	-0.03	-0.01	0.03	-0.02
27	-0.01	0.07	0.02	0.02	0.00	-0.01	0.04	-0.02
28	0.02	0.06	0.11	-0.01	0.00	-0.01	-0.02	-0.02
29	0.02	0.00	0.03	0.00	0.00	-0.05	0.03	0.02
30	0.04	-0.03	0.02	0.08	0.00	-0.12	0.00	0.04
Number of Observations	2405	670	201	1442	2405	670	201	1442

- i. The FTA-ITC results suggest slightly more dependence than those of the FTA-AS.
- ii. The absolute size of the largest serial correlation coefficient is in fact fairly small (.33) and is usually although not always confined to the lag 1 cases.
- iii. The average coefficients of the sub-periods with the exception of period 3 for the FTA-AS are slightly higher than those for the full sample period. The highest average (.08) is for period 1 on the FTA-ITC index.

In general our results confirm the work of other authors in this area described in Chapter 2. Note particularly that it is extremely doubtful whether the absolute size of the coefficient would be sufficient to base a profitable trading strategy on. For example a first order model with the largest coefficient would still only account for $(.33)^2$ of the return variation. Transaction costs would further reduce any possibility of profitable trading. In view of this further work in fitting either moving average or auto-regressive type models would serve no financial purpose.

While concluding that returns on the two indices are sufficiently independent to support the weak form EMH two further concluding comments are required. First of all the higher sub-period averages particularly for the coefficient on the FTA-ITC index indicate the extent to which ignoring non-stationarity can potentially influence the results. Secondly Working has shown

that serial correlation can be induced by using the first differences of averages in a random chain.²⁵ Undoubtedly there will be elements of the "Working Effect" present in our results. To the extent that these effects are present our results will over-state possible serial correlation.

- (ii) Individual ITCs : The returns on the two indices used in the previous section were of course based on market value weighted portfolios. In order to establish that the results held at the individual ITC level serial correlation coefficients were calculated for the returns from individual ITCs. The returns used were the log transforms of those described in equation 3(i) with one additional correction. Average daily returns were calculated by weighting the log returns by the number of elapsed days between trades.²⁶

$$\text{i.e. } \bar{R}_{iD} = \text{Log } (R_{it} + 1) / T \quad 3(v)$$

where;

$$\bar{R}_{iD} = \text{Average daily return on ITC}_i.$$

$$\tilde{R}_{it} = \text{Return as per equation 3(i).}$$

$$T = \text{Number of elapsed days between } t \text{ and } t-1.$$

The results are shown in Table 3(x).

25. H. Working. "Note on the Correlation of First Differences of Averages in a Random Chain", *Econometrica*, 1960, pp. 916-918.

26. We deal in more detail with weighting in Chapter 4.

TABLE 3(x)

<u>Investment Returns</u> <u>Average Serial Correlation Coefficient</u> <u>Average Daily Returns</u> 97 ITCs - 1971 - 1980		
Description	Lag 1	Lag 2
Mean	0.06	-0.12
Range		
Minimum	-0.01	-0.32
Maximum	0.30	0.15

Perhaps the most interesting point to note is the change from a predominantly positive lag 1 range to a predominantly negative lag 2 range. Indeed some 74% of the lag 1 coefficients had positive signs and 87% of the lag 2 coefficient had negative signs. However given the very small size of even the largest coefficients the sign changes while suggesting some very slight evidence of negative dependency are really too small to have any financial effect. We can safely conclude that the degree of dependence is sufficiently small not to undermine the weak form EMH.

5. Return Components : The final aspect of ITC equity returns we examine are the relationships that exist between the returns on different ITCs. It is clear that if the returns on different ITCs exhibit some elements of communality the task of performance assessment is made considerably easier. Without such communalities there can be no certainty in either equilibrium pricing models or in the choice of performance benchmarks that are applicable to all ITCs.

The identification of communalities essentially centres on the correlation matrix of returns. This indicates the degree of linear association between the returns from different ITCs. Reasonably high correlation coefficients may suggest the presence of underlying factors common to all ITCs. Principal component techniques can then be used to identify the presence of one or more common factors. Later in this section we present results based on this methodology.

While there is a considerable literature in this area our review is confined to four articles which provide a reasonable perspective of the received results. We deal with these in chronological order.

- (i) King²⁷ : Using monthly price relatives from 63 N.Y.S.E. securities over the 403 month period June 1927 to December 1960 King was concerned with the identification of communalities and with assessing their stationarity. In particular he investigated whether three effects namely market, industry and individual

27. B. King, "Market and Industry Factors in Stock Price Behaviour", Journal of Business, 39, 1966.

firm would be sufficient to " ... account for the complex interrelationships of the ensemble of security price changes." A subsidiary objective of his study was to determine whether the industry effect was sufficient to support a security classification scheme. Using factor and cluster analytic techniques he reported that approximately 50% and 11% of a security's return variance could be accounted for by market and industry effects. He did however note that these percentages were not entirely stationary through time. In particular the importance of the market factor appeared to be less in later periods.

- (ii) Myers²⁸ : Myers suggested that there is danger in overemphasising the generality of King's results. Firstly King's sample selection was based on relatively well defined and homogeneous security groupings such as tobacco, railroads and petroleum etc. The industry effect may be considerably less with more heterogeneous security groups. Secondly Myers suggested that King's choice of factor technique would tend to over-emphasise the importance of his results.

By constructing two samples of 60 securities each the first being broadly similar to King's sample selection while the second included six additional industry groups Myers attempted to correct for the above weaknesses in King's work. His reported results cover both the period of King's work and the succeeding seven years.

28. S. Myers, "A Re-examination of Market and Industry Factors in Stock Price Behaviour", *Journal of Finance*, 28, 1973, pp. 695-705.

The relative importance of the market factor and its downward trend were both confirmed by Myers. However while the presence of a second factor underlying return variances was identified it was not strongly related to an established industrial classification.

- (iii) Draper²⁹ : Working with quarterly data from 520 U.K. companies for the period 1965 - 1970 Draper utilised the decomposition attributes of ANOVA techniques to identify a sector effect in returns. In addition he reported industry effects broadly comparable to those of King. Interestingly though he noted that several groups including ITCs that could be considered relatively homogeneous were not in fact significantly distinguishable from other groups.
- (iv) Roll and Ross³⁰ : As part of their work on testing the APT Roll and Ross performed a detailed and sophisticated factor analysis on the daily returns from 1260 U.S. securities for the period July 3 1962 to December 31 1972. Their results suggest that at least five explanatory factors can be identified of which at least three appear to attract significant elements of pricing. Interestingly they don't attempt to identify the factors with economic variables. We deal in more detail with theoretical results of APT in Chapter 5.

It is clear from the above results that we would expect elements of communality to be present in the returns of ITCs. Two such elements may well be related to market-wide and industry wide effects.

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- 29. P. Draper, "Industry Influences on Share Price Variability", Journal of Business Finance & Accounting, Summer 1975, pp. 169-185.
 - 30. R. Roll, S. Ross, "An Empirical Investigation of Arbitrage Pricing Theory", Journal of Finance, 35, December 1980, pp. 1073-1103.

As a first stage to investigating this possibility a correlation matrix of the average daily returns as per equation 3(v) for 97 ITCs between 1971 and 1980 was obtained.³¹ The full matrix is substantial and not reproduced. On review it was visually apparent that very substantial correlations were present between the returns. Indeed the majority of coefficients were in excess of 0.7. This result strongly suggests the presence of at least one element of communality.

In order to examine the extent of any such communalities a series of tests were carried out. The methodology adopted was based on principal components and ordinary least squares regression.

Principal components analysis is a multivariate statistical technique which along with other factor analytic methods offers a useful approach to investigating correlation matrices. The technique involves the generating of a series of factors to account for the total variance of all the variables under consideration. Each factor extracted is independent of all the others and therefore successively drawn factors will account for less and less of the total variance. The attraction of the technique is that a relatively small number of factors out of a maximum number equivalent to $n-1$ variables in our case 97-1 ITCs may account for a relatively large proportion of the total variance. Clearly if this is the case then operating definitions can be hypothesised for these factors. We stress the term hypothesised as the factors themselves have no direct economic interpretation. They merely serve to indicate that an underlying economic variable may be present in the data. We adopt an extremely conservative approach to applying principal components analysis.

31. Note that although we use average daily returns the number of days between trades on which this average is based does vary. Therefore the correlation matrix of returns is a slightly inaccurate estimate of the 'true' correlation matrix. However as the purpose of this section is investigative rather than conclusive we suggest acceptance of this weakness.

Indeed in each of the principal component runs performed we are only concerned with gaining an approximate estimate of the variance accounted for by the first factor which tends to be a general factor. Our conservative application of the technique seeks to by-pass problems associated with either the selection of a rotational method to improve the initial estimates of factor loadings or the statistical significance of the results.³² Our results are summarised in Tables 3(xi) and 3(xii) which appear at the end of this section.

In column 2 of Table 3(xi) the percentage of variance explained by the first factor extracted by principal components from the returns on 97 ITCs is reported as approximately 72%. All the factor loadings were noted as positive. This strongly suggests the presence of an underlying element of communality. Following MPT and the results reported by the authors reviewed above this factor was hypothesised as representing a general market-wide factor. Using the returns on the FTA-All Share index as a surrogate for this factor the following market model regressions were carried out for each ITC.

$$\tilde{R}_{it} = \hat{\alpha}_i + \hat{\beta}_{im} \tilde{R}_{mt} + \tilde{e}_{it} \quad 3(vi)$$

where;

\tilde{R}_{it} = The return on ITC_i as per equation 3(vi)

\tilde{R}_{mt} = The return on the FTA-AS index as per equations 3(i) and 3(ii).

The regression results are reported in Table 3(xii). The results are reported as averages for the sample as a whole. The high R^2 suggests

32. Principal components and other similar techniques are not without their critics. See for example:
B. Rosenberg, "An Application of a Three Factor Performance Index to Measure Stockholder Gains from Mergers", *Journal of Finance and Quantitative Analysis*, March 1976, pp. 265-266.

Perhaps the most persistent practical problem is the danger of confusing ex post explanatory factors with ex ante variables.

as we would expect that the market component is a particularly important element of communality amongst ITCs.

Having extracted the market component it remained to be seen whether any further elements of communality could be identified. In column 3 of Table 3(xi) we report the results of a principal components run on the residual, \tilde{e}_{it} , from the market model regressions. Some 35% of the remaining variance is accounted for by the first factor. Again all the factor loadings were noted as positive. While considerably less than the results on the raw return data 35% is still large enough to warrant investigation. Unfortunately while there is a substantial body of theoretical and empirical work suggesting the presence of a market component in returns there is no comparable status ascribed to other economic variables. The work by Roll and Ross reviewed above allows for the possibility of other factors but does not attempt to define them in any economic sense. In view of this it is only with the greatest caution that we suggest the presence of a second industry related communality effect.

To obtain an industry effect the following regressions were run;

$$\tilde{R}_{Fit} = \hat{\alpha}_{Fi} + \hat{\beta}_{Fi} \tilde{R}_{mit} + \tilde{E}_{Fit} \quad 3(vii)$$

where;

\tilde{R}_{Fit} = The return on the FTA-ITC index as per equations 3(i) and 3(ii).

\tilde{R}_{mit} = The return on the FTA-AS index as per equations 3(i) and 3(ii).

The residuals, \tilde{E}_{Fit} , from the regressions represent an estimate of the return components of the FTA-ITC index not accounted for by the return on the market. As the FTA-ITC index is made up of approximately

100 ITCs it can be considered as a reasonably well diversified portfolio of ITCs. This assumption implies that the individual ITC return components are diversified away in the portfolio leaving the regression residuals to represent an estimate of the ITC "industry effect".

These residuals together with the returns on the FTA-AS index were treated as independent variables in the expanded regression,³³

$$\tilde{R}_{it} = \hat{\alpha}_i + \hat{\beta}_{i1}\tilde{R}_{mt} + \hat{\beta}_{i2}\tilde{E}_{Ft} + \tilde{Q}_{it} \quad 3(viii)$$

where;

$\tilde{R}_{it}, \tilde{R}_{mt}, \tilde{E}_{Ft}$ are as defined before.

As the individual observations on the two indices and the ITC marks were data aligned the expanded regression equation 3(viii) represents a set of unique return observations for each ITC. The results are reported in column 3 of Table 3(xii).

Equation 3(viii) is clearly a better fit than equation 3(vi). The average R^2 increases to .77 and the sum of the squared residuals drops by approximately 25%. In addition the new coefficient term that represents in industry effect was noted as statistically significant at the 95% level for all ITCs. It would appear then that our hypothesised industry effect is a significant ex post explanatory variable.

To complete our tests a principal components analysis was run on the residuals, \tilde{Q}_{it} , from equation 3(viii). The results are shown in column 4 of Table 3(xi). We now have a relatively small amount of

33. The use of the residuals from the index regression equation 3(vii) was preferred to the use of the returns on the FTA-ITC index as inserting the latter as an independent variable in equation 3(viii) would have resulted in the introduction of multi-colinearity into the model. As we were concerned with among other points assessing the significance of the industry coefficients the residual method was preferred.

TABLE 3(xi)

<u>Investment Returns</u> <u>Results of Principal Components Run</u> <u>Average Results 97 ITCs</u>			
Factor	Cumulative Percentage of Variance Explained		
	R_{it}	Residuals - 3(vi)	Residuals - 3(viii)
1	71.89	35.29	10.01
2	75.73	42.14	17.32
3	77.34	46.69	22.48
4	78.80	50.12	26.52
5	80.15	53.12	30.18
6	81.31	55.74	33.59
7	82.37	57.94	35.72
8	83.37	59.99	39.85
9	84.25	61.85	42.69

TABLE 3(xii)

<u>Investment Returns</u> <u>Results of Regression Runs</u> <u>Average Results 97 ITCs</u>		
Description	Equation 3(vi)	Equation 3(viii)
R^2	0.63	0.77
$\Sigma e^2, \Sigma Q^2$	.409E-03	.272E-03
β_1	0.93	0.93
(t)	(14.67)	(14.67)
β_2	-	0.76
(t)	-	(8.76)

variance accounted for by the first factor. We suggest that 10% is too small to warrant further consideration.

It is clear both from the above results and literature review that on an ex post basis returns contain elements of communality associated with both market and industry effects. There may well be other elements "hidden" in the 10% factor noted above although their explanatory power is going to be considerably less than either of the effects already identified. To the extent that much of MPT relies entirely on the market related component the omission of an industry effect may well be a weakness. The alternative approach to equilibrium pricing suggested Roll and Ross offers a possible role for an industry effect although it has not been specifically defined or tested. Clearly the possibility of there being more than one priced element underlying the returns of ITC has important implications for performance assessment and indeed it is an area we return to in later chapters.

Summary : In this chapter we have defined the concept of an investment return. In addition we have examined the distributional and time series characteristics of ITC returns as well as providing some evidence of underlying communalities. It is clear that assumptions suggesting that return distributions are both independent and stationary-normal are in fact violated in practice. This we reported as being more so in the case of the latter assumption. To the extent of these violations financial models based on either of the two assumptions are weakened. We do not however suggest that such financial models be rejected. The usefulness of models lies after all in their predictive powers. It may well be that the predictions are fairly robust even in spite of weaknesses in the underlying assumptions.

The presence of more than one element of return communality questions the relevance of pricing models such as CAPM which only allows one element of returns to be priced. Unfortunately as we noted above there is little theoretical justification to define other non-market related variables. At best we can intuitively suggest that the homogeneity of the ITC sector gives rise to what we have termed in a very general way an industry effect.

CHAPTER FOUR

INVESTMENT RISK

Introduction

Section 1 : The Relevant Measures

Section 2 : Estimation Procedures

Section 3 : The Empirical Estimates

Section 4 : The Management of Risk

Summary

INTRODUCTION : In this chapter we are concerned with establishing empirical estimates of the investment risk associated with ITC equity ownership. We do this by first of all defining the relevant risk measures (Section 1). Secondly we describe the estimation procedures adopted (Section 2). In Section 3 we provide the empirical estimates. Finally in Section 4 we discuss the management of risk.

1. The Relevant Measures : What constitutes risk in the mind of a fund manager or an investor is particularly difficult to establish. Inflation risk, political risk, geographic risk, the list is unfortunately endless. We can do no more than attempt to establish an observable surrogate for this population of risks. However what can be assumed is that investors' perceptions of the risks associated with a particular security or portfolio of securities will be closely related to the returns expected from these holdings. The establishment of financial models relating expected return to risk occupies perhaps the most crucial cornerstone of modern investment theory. Ultimately these models lead to conclusions about equilibrium asset pricing under conditions of uncertainty.

In this chapter we are mainly concerned with deriving risk measures from one such equilibrium model namely the capital asset pricing model (CAPM). Indeed underlying not only our risk measures but also many of our performance results is a belief in the general usefulness of this model. CAPM is usually credited to the work of Sharpe and Lintner.^{1,2} Like all equilibrium models it suffers from the twin problems of ex ante estimation and unrealistic assumptions. It is arguable that later developments to the original CAPM, in particular the work by Black,

1. W. Sharpe, "Capital Asset Prices : A Theory of Capital Market Equilibrium under Conditions of Risk", Journal of Finance, 19, September 1974, pp. 425-442.

2. J. Lintner, "The Valuation of Risk Assets and the Selection of Risky/

remove many of the latter criticisms although costs in terms of more complex estimation procedures are often involved.^{3,4,5} We assess the validity of CAPM together with its usefulness for performance measurement in Chapter 5. However from the results of Chapter 3 where we identified an element in the correlation matrix of ITC returns additional to that associated with the market it is clear that the unique role assigned to the market portfolio by CAPM is not above criticism. In Chapter 5 we describe an alternative equilibrium model the Arbitrage Pricing Theory (APT) which specifically allows tests for performance differences that arise for reasons other than differing market risk levels.

There are three quite distinct aspects to CAPM. Firstly there is a hypothesised model of individual investor behaviour. Secondly given this model there is the establishment of an optimum individual investor strategy. Thirdly there is the extension of the individual investor case to the world of many investors and thus the derivation of an equilibrium risk-return relationship at the market level.

- (i) Individual Investor Behaviour : We can establish a model of investor behaviour fairly easily by assuming that having decided on the level of resources to allocate to investment an investor in constructing a portfolio of risky assets will for any given level of return prefer less risk to more and for any given level of risk will prefer more return to less. Investors

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- / Investments in Stock Portfolios and Capital Budgets", Review of Economics and Statistics, 47, February 1965, pp. 13-37.
3. F. Black, "Capital Market Equilibrium with Restricted Borrowing", Journal of Business, 45, July 1972, pp. 444-454.
4. M. Brennan, "Capital Market Equilibrium with Diverging Borrowing and Lending Rates", Journal of Financial and Quantitative Analysis, 6, December 1971, pp. 1197-1205.
5. S. Ross, "The Current Status of the Capital Asset Pricing Model", Journal of Finance, 33, June 1978, pp. 885-901. The article provides a very good /

therefore are assumed to be risk averse. In addition investors are assumed to be primarily concerned with risk and return at the portfolio level. The importance of individual securities is limited to their contribution to investors' total portfolios. While such a marginal approach has considerable intuitive appeal its real practical importance stems from the principles of diversification. Interestingly the relevance at least to some ITC equity holders of this marginal approach may be doubtful. For example as we noted in Chapter 1 some investors may consider gaining access to a diversified portfolio preferable to constructing one themselves. If this is the case then it may well be that total measures of risk and return are more relevant than marginal ones. In other words ITC equities are being treated as "complete portfolios" rather than as contributory elements.

- (ii) The Optimal Policy for an Individual Investor : The assumption of risk aversity together with the additional assumption that expected portfolio returns are normally distributed allows the construction of the well known Markowitz efficient frontier and a unique series of indifference curves for each investor.^{6,7,8}

Perhaps the most useful result of assuming that portfolio returns are distributed normally lies in the fact that normal distributions are completely described once their means and variances have been established. This allows the investment decision process to be

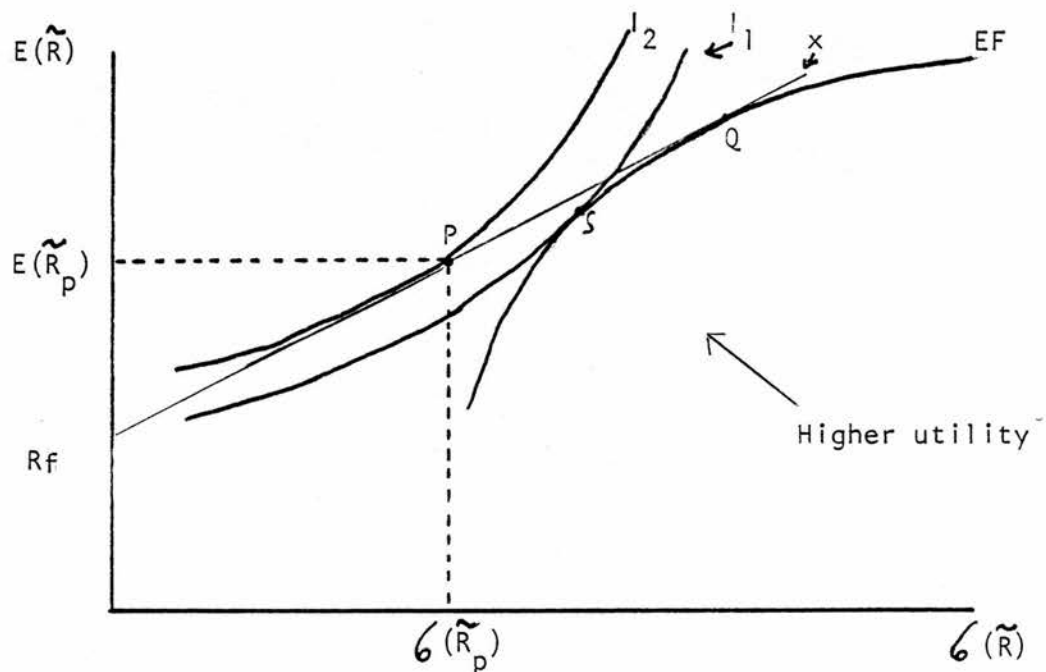
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- / survey of various generalisations made to the original Sharpe-Lintner model. These include adaptations to cover inflation, international portfolios, human capital and taxation.
6. J. Tobin, "Liquidity Preference as Behaviour Towards Risk", Review of Economic Studies, 35, February 1958, pp. 65-85.
 7. H. Markowitz, "Portfolio Selection", Journal of Finance, 7 March 1952, pp. 77-91.
 8. H. Markowitz, "The Utility of Wealth", Journal of Political Economy, April 1952, pp. 151-158.

proxied in terms of two parameters namely expected return and the variance from expected return. The financial relevance of the mean-variance approach depends upon a willingness to accept that it adequately reflects the risk return expectations that investors hold about portfolios. On this point there may be some question as to the relevance of using a total measure of dispersion especially if investors' true risk perceptions are in terms of downside exposure rather than total variability. Several authors have explored the possibilities of using measures such as semi-variance to highlight downside risk.⁹ The general conclusion is that they are considerably more difficult to work with than total measures of variability.¹⁰ In addition as long as we can assume ex ante return distributions that are reasonably symmetrical the use of total measures will not result in any changes to risk rankings. As normal distributions are both symmetrical and from Chapter 3 appear to be a reasonable although not wholly accurate result for the expost distributional form of ITC returns we retain variance as our primary measure of portfolio risk. U.S. evidence on the symmetry of equity returns is reported by Blume.¹¹

So far we have only considered an investment set consisting of risky assets. The presence of a risk-free asset together with opportunities to borrow and lend at that rate provides a vital extension to the optimum strategy available to the individual investor. We describe this in Diagram 4(i).

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9. W. Hogan, J. Warren, "Towards the Development of an Equilibrium Model based on Semi-Variance", *Journal of Financial and Quantitative Analysis*, 9 January 1974, pp. 1-11.
 10. F. Modigliani, G. Pogue, "An Introduction to Risk and Return - Concepts and Evidence," *Financial Analysts Journal*, March/April 1974, p.71.
 11. M. Blume, "Portfolio Theory. A Step Towards its Practical Application" *Journal of Business*, 43, April 1970, pp. 152-173.

DIAGRAM 4(i) :

Investment RiskOptimum Investment Strategy for the Individual Investors

- where ; I_1, I_2 = Indifference curves for investor I
- $E(\tilde{R}_P) \sigma(\tilde{R}_P)$ = Expected return and risk on portfolio P
- P = Utility maximising portfolio for Investor I
- EF = The efficient frontier of portfolio investment opportunities
- R_f = Risk-free rate
- $R_f PX$ = Efficient frontier with a risk-free asset and lending and borrowing at that rate.

Given an investor's set of indifference curves the presence of a risk-free asset together with lending and borrowing at the risk-free rate allows the investor to move to a higher indifference curve. For example portfolio P represents the optimum investment strategy for investor 1. This portfolio dominates portfolio S that which investor 1 would have favoured had the risk-free opportunities not been present. At point P investor 1's portfolio would consist of an investment R_fP in the risk-free asset and an investment PQ in the efficient portfolio of risky assets Q.

- (iii) Capital Market Equilibrium : We now consider the implications of all investors acting in the manner hypothesised in (i) and (ii) above. Effectively each investor is now a price-taker in the sense that his actions and influence are small relative to that exercised by the market participants as a whole. When the capital market is in equilibrium the resulting market clearing set of asset prices fixes the efficient frontier and allows each investor to complete his optimum portfolio strategy. However to consider a risk-return relationship at the market level that is in any way general and useful we cannot allow each individual investor the luxury of his own unique efficient frontier. There must in fact be complete agreement amongst all investors as to their expectations for all securities. An implication of this assumption of homogeneous investor expectation is that securities markets are strong form efficient. Clearly investor expectations will be conditioned by the length of the time period to elapse before they are realised. Therefore in addition to the assumption of homogeneous expectations we require a further assumption equating investors' investment horizons.

When these assumptions are in force our efficient portfolio Q

takes on very considerable significance. Indeed all investors will now attempt to hold Q either on its own, in combination with the risk-free asset or by leveraging their resources allocated to investment through borrowing at the risk-free rate and investing the total in Q . If Q represents the only portfolio of risky assets investors attempt to hold then the prices of risky assets will adjust until they are all marginally eligible for inclusion. Thus in the disequilibrium situation where a particular risky asset is not included in Q its price will drop until it becomes attractive for investors to sell some of their existing holdings and using the proceeds purchase the additional asset. The condition of marginal eligibility for all risky assets will exist when portfolio Q contains all risky assets in proportion to their respective market valuations. When this condition has been met a market clearing set of prices will exist, a unique efficient frontier known as the capital market line will have been established and the capital market will be in equilibrium. In this equilibrium state the ex ante portfolio Q is known as the market portfolio.

There are two implications that stem directly from the above derivation of CAPM as a model of capital market equilibrium. We state both without proof. The proofs can be found in Fama.¹² Firstly all portfolios lying on the capital market line are both ex ante efficient and linearly related to the market portfolio as follows :

12. E. Fama, "Foundations of Finance", Oxford 1976, Chapters 7 and 8.

$$E(\tilde{R}_p) = R_f + [E(\tilde{R}_m) - R_f] \sigma(\tilde{R}_p) / \sigma(\tilde{R}_m) \quad 4(i)$$

where:

- \tilde{R}_p = The return on efficient portfolio P
- \tilde{R}_m = The return on the market portfolio M
- R_f = The return on a risk-free asset
- $\sigma(\tilde{R}_p)$ = The standard deviation of the returns on portfolio P
- $\sigma(\tilde{R}_m)$ = The standard deviation of the returns on the market portfolio M.

Secondly in conditions of capital market equilibrium the expected return on any individual security or portfolio irrespective of its efficiency is :

$$E(\tilde{R}_i) = R_f + [E(\tilde{R}_m) - R_f] \text{Cov}(\tilde{R}_i, \tilde{R}_m) / \sigma^2(\tilde{R}_m) \quad 4(ii)$$

where:

- R_f, \tilde{R}_m = As above
- \tilde{R}_i = The return on security i
- $\text{Cov}(\tilde{R}_i, \tilde{R}_m)$ = The covariance between the returns on security i and the market portfolio m.
- $\sigma^2(\tilde{R}_m)$ = The variance of the market portfolio.

Equation 4(ii) is usually shown in its simpler form with,

$$\text{Cov}(\tilde{R}_i, \tilde{R}_m) / \sigma^2(\tilde{R}_m) = \beta_{im}$$

Restating 4(ii):

$$E(\tilde{R}_i) = R_f + \beta_{im} [E(\tilde{R}_m) - R_f] \quad 4(iii)$$

Strictly speaking the linear aspects of the relationships between risk and return described by equations 4(i) and 4(ii) can be derived from assumptions weaker than full capital market equilibrium. They will of course be quantitatively different for each investor without the key equilibrating assumption of homogeneous expectations. However the linearity of equation 4(i) is established for any efficient portfolio merely through the possibility of lending and borrowing at the risk-free rate. When capital market equilibrium is established the only relevant efficient portfolio of risky assets is the market portfolio thus leading to equation 4(i). Similarly the linear relationship between the risk and return for an individual asset can be derived from any minimum variance portfolio containing that risky asset. A minimum variance portfolio is a portfolio constructed in such a way that the weights attached to the constituent securities minimise the variance for a given level of expected return. The risk of portfolios constructed this way is determined by both the variances of the individual securities and the covariances between them. The condition of capital market equilibrium restricts the choice of minimum variance portfolios first of all to those that are efficient and secondly to one portfolio in particular namely the market portfolio. While we return to the role of the market portfolio in Chapter 5 we note that its ex ante efficiency is perhaps the most fundamental and controversial aspect of CAPM.

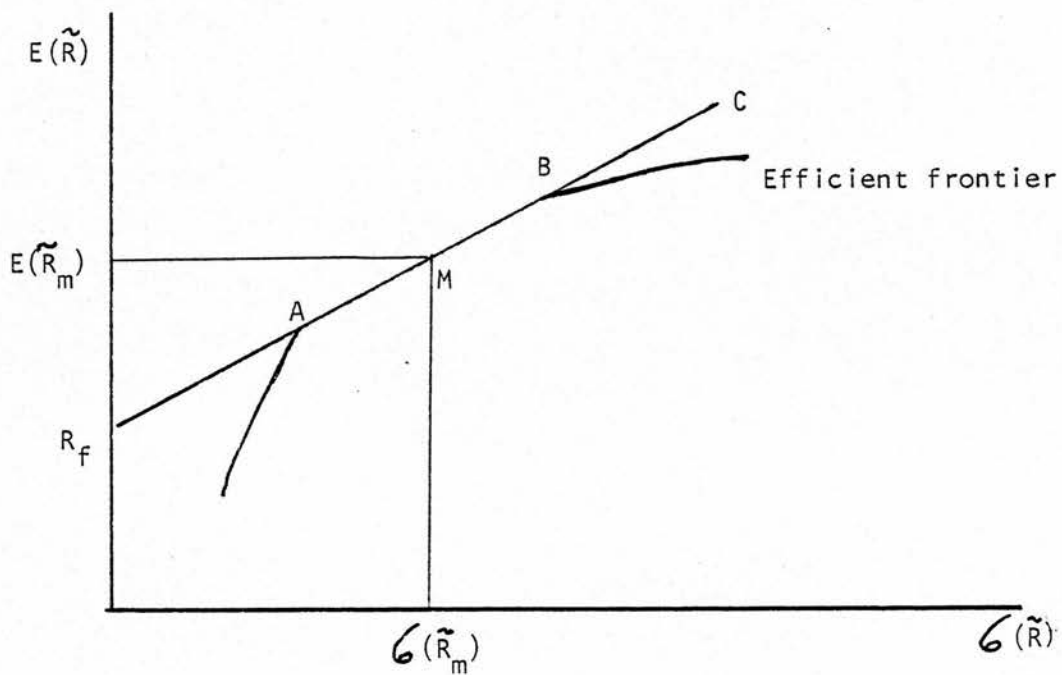
In deriving relevant risk measures we first of all re-emphasise the difference between equations 4(i) and 4(ii). The former

holds only for efficient portfolios while the latter holds for all individual securities and portfolios irrespective of their efficiency. Interestingly Sharpe has suggested a useful extension to equation 4(i). In particular there could exist multiple points of tangency between the efficient frontier and the capital market line. Diagram 4(ii) describes this point.¹³

DIAGRAM 4(ii)

Investment Risk

The Efficient Frontier and the Capital Market Line



where; R_f, A, M, BC = Capital Market Line

13. W. Sharpe. "Reply" Journal of Finance, 20, March 1965, pp. 94-95.

The implication of Sharpe's analysis is that there may well be risky assets or portfolios of risky assets whose composition is not that of a market portfolio but whose returns are perfectly correlated with the market portfolio. As these portfolios would offer investors alternatives to the market portfolio without violating any of the assumptions of equilibrium under CAPM their appropriate measure of risk is clearly total risk. Equation 4(i) can now be interpreted as one of a series of identical equations - one for each alternative to the market portfolio. The relevant measure of risk for each of these portfolios including the market portfolio is $\sigma(\tilde{R}_p)$ the standard deviation of return.

Sharpe's argument has a particular significance for ITCs. As we have noted several times investors may perceive ITC equity as allowing access to a well diversified portfolio. If this is the case then ITC equity may well be considered an alternative to the construction of a market portfolio. In such circumstances total risk is the appropriate risk measure for ITCs. The investor group most likely to consider ITC equities in this manner are individuals who perhaps lack the resources or funds to construct their own market portfolios.

However for those investors who feel uneasy about the existence of an individual asset or portfolio whose returns are perfectly correlated with those of the market the relevant portfolio of risky assets is the market portfolio. In equilibrium each investor will hold the market portfolio and if necessary will borrow or lend at the risk free rate in order to reach a desired level of risk

exposure. As the market portfolio is the appropriate portfolio of risky assets to hold the relevant risk measure for an individual asset (or portfolio) is the risk contribution made by that asset to the market portfolio. Thus from equations 4(ii) and 4(iii) the proportionate factor is;

$$\beta_{im} = \text{Cov}(\tilde{R}_i, \tilde{R}_m) / \sigma^2(\tilde{R}_m)$$

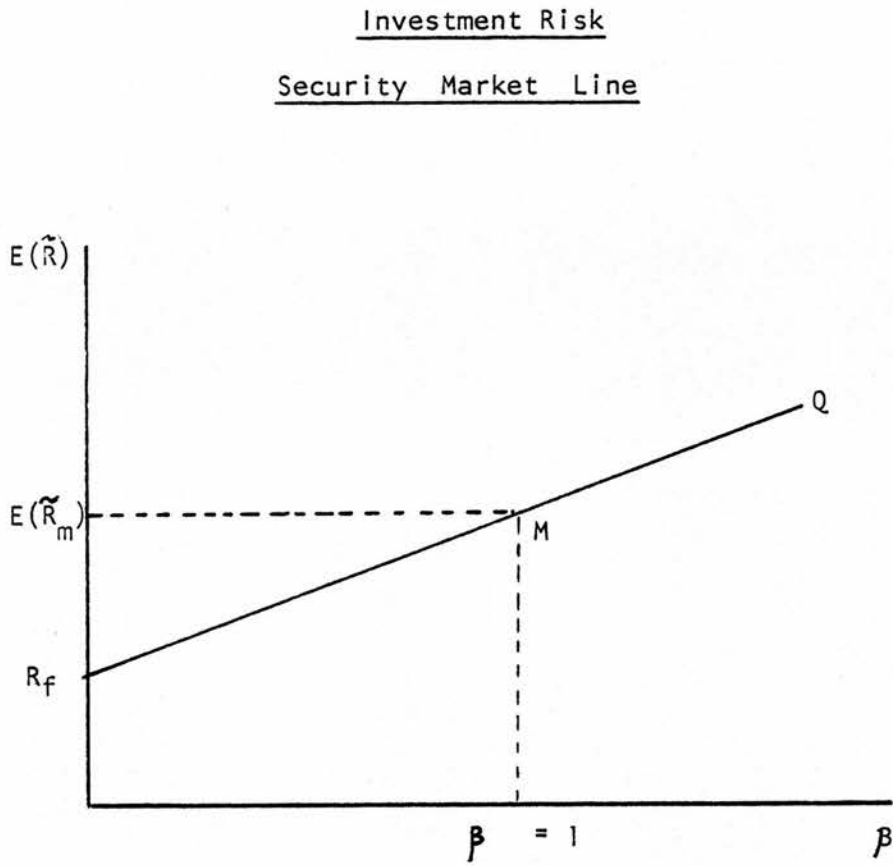
In order to keep risk in the same units as returns the beta factor is usually applied against the market risk defined not in terms of variance but standard deviation.

i.e. $\beta_{im} \sigma(\tilde{R}_m) =$ The risk of asset i in the market portfolio.¹⁴

The equilibrium risk return relationship of equations 4(ii) and 4(iii) is usually summarised by the security market line which plots expected return against the proportionate factor β_{im} for each member of the population of risky assets. This is demonstrated in Diagram 4(iii).

We now have two measures of risk. The first $\sigma(\tilde{R}_i)$ is relevant if we consider ITC equity as an alternative to the market and the second $\beta_{im} \sigma(\tilde{R}_m)$ is relevant if we consider ITC equity in the context of the market portfolio. The latter may well be the case for such ITC equity holders as pension funds or indeed other ITCs.

14. Usually referred to as the market risk or systematic risk of asset i .

DIAGRAM 4(iii)

where; $(\tilde{R}), \beta, R_f$ = as defined above

R_f, M, Q = Security Market Line

M = Market portfolio with $E(\tilde{R}_m)$ and $\beta = 1$.

It is important to note that these are the only two measures of risk that flow directly from the equilibrium conditions implied either by CAPM or by Sharpe's "extended" CAPM which includes points of multiple tangency on the efficient frontier. In reality however the validity of homogeneous expectations amongst

investors is clearly questionable. Thus an investor may well not hold the ex ante efficient market portfolio either through an inability to identify it correctly or through the belief that his alternative expectations are superior. To the extent that selected portfolios differ from the market portfolio the relevance of $\beta_{im} \epsilon(\tilde{R}_m)$ as a measure of risk is weakened. Similarly in conditions of disequilibrium our measure of total risk loses its theoretical justification. Both these measures however retain considerable intuitive appeal. For example systematic risk reflects the widely held belief that the returns on an asset are related to market-wide movements while total risk is useful in terms of describing the variability of expected returns.

To the extent that individual securities and portfolios are not efficient equation 4(iii) should be restated as ;

$$E(\tilde{R}_i) = R_f + \beta_{im} [E(\tilde{R}_m) - R_f] + E(\tilde{e}_i) \quad 4(iv)$$

where:

$$E(\tilde{e}_i) = \begin{array}{l} \text{The expected return of the non-market} \\ \text{component in } E(\tilde{R}_i) \end{array} \quad 15$$

Whereas before we had two measures of relevant risk depending upon which version of CAPM was preferred we can now identify the following additional element. For later convenience we also re-state the model in excess return space.

15. For an efficient portfolio ; $E(\tilde{e}_p) = 0$.

Rearranging 4(iv) ;

$$E(\tilde{R}_i) - R_f = \beta_{im} [E(\tilde{R}_m) - R_f] + E(\tilde{\epsilon}_i).$$

$$\text{Var} [E(\tilde{R}_i) - R_f] = \beta_{im}^2 \text{Var} [E(\tilde{R}_m) - R_f] + \text{Var} [E(\tilde{\epsilon}_i)] \quad 4(v)$$

where;

$$\text{Var} [E(\tilde{\epsilon}_i)] = \text{the variance of the non-market risk of asset } i.$$

As $[E(\tilde{\epsilon}_i)]$ is unpriced in equilibrium there is the strong implication that in the construction of the market portfolio these unique or unsystematic elements of risk cancel out.

If an investor rejects the perfectly diversified market portfolio then elements of risk are being incurred for which there can be no return. ITC managers although perhaps not their investors may well believe that such rejection is justifiable in terms of their skills at producing estimates of expected returns that are superior to those of the market.

Table 4(i) summarises the three measures of risk.

TABLE 4(i)

Investment Risk	
The Relevant Measures	
Total Risk	$\sigma [E(\tilde{R}_i) - R_f]$
Market Risk	$\beta_{im} \sigma [E(\tilde{R}_m) - R_f]$
Unique Risk	$\sigma [E(\tilde{e}_i)]$

2. Estimation Procedures : The usefulness of all three risk measures described above depends upon the possibility of estimating the ex ante variables $E(\tilde{R}_i)$ and $E(\tilde{R}_m)$. These could of course be estimated subjectively. However the process of establishing risk estimates is made considerably more straightforward if the model of market equilibrium can be translated into terms of ex post realisations. This can in fact be achieved in two steps.

First of all as CAPM is formulated in terms of returns calculated over a single period that is the same for all investors the resulting risk measures are strictly only appropriate for that period. While such an assumption eases the problem of deriving market equilibrium under CAPM it severely restricts the applicability of the model. In particular the usefulness of the model would be greatly increased if it was valid

for both more than one investment period and for the possibility of heterogeneous investment horizons among different investors. Jensen has shown that in market conditions where continuous trading can be assumed CAPM will hold for one or more time period; of arbitrary length.¹⁶ Thus equation 4(iii) becomes;

$$E(\tilde{R}_{it}) - R_f = \beta_{im} [E(\tilde{R}_{mt}) - R_f] \quad 4(vi)$$

Jensen also indicates that the appropriate measure of return is that calculated in continuous time. We note in passing that the extension of CAPM into a multiperiod model assumes that β_{im} is constant over the various return periods. While this implication may well be applicable for most industrial concerns there are clear doubts about its validity as far as ITCs are concerned. In particular if one of the management skills claimed by ITC managers is market timing, that is the accurate prediction of bull and bear markets, they will be very much concerned with adjusting levels of market exposure to reflect their market expectations. We return to the area of non-stationary risk measures below.

Secondly to complete the formulation of CAPM in terms of ex post realizations we call on the statistically based market model (MM).^{17,18} The MM hypothesises a return generating process of individual assets based on the assumption that portfolio returns are normally distributed. As it is essentially a statistical model rather than a financial model

16. M. Jensen, "Risk, The Pricing of Capital Assets and the Evaluation of Investment Portfolios", *Journal of Business*, 42, 1969, pp. 167-247.

17. W. Sharpe, "A Simplified Model for Portfolio Analysis", *Management Science*, January 1963, pp. 277-293.

18. E. Fama, "Risk, Return and Equilibrium: Some Clarifying Comments" *Journal of Finance*, 33, March 1968, pp. 29-40.

of market equilibrium its parameters can validly be estimated from ex post observations. There are two steps involved in applying the MM to CAPM. First we briefly describe the MM and secondly we formally show its incorporation into CAPM.

Given that the return on any portfolio is;

$$\tilde{R}_p = \sum_{A=1}^n x_A \tilde{R}_A \quad 4(vii)$$

where x_A = weight attached to asset A in portfolio p

then to assume that portfolio returns follow a normal distribution implies that drawings from any linear combination of return observations will be normal. If this holds irrespective of the weights (x_A) applied then the assumption of normally distributed portfolio returns implies that the joint distributions of returns on individual securities are multi-variate normal. Whether this assumption is valid or not is of course an empirical matter. However we note that multi-variate normalcy requires the necessary but insufficient condition that individual returns are normally distributed. In Chapter 3 we established that although this assumption was not entirely validated it is a reasonable assumption in the context of ITCs. Therefore our results while not specifically testing for multi-variate normalcy are at least consistent with the assumption.

With portfolio returns assumed to be normal and security returns multi-variate normal then a distribution formed from drawings on the joint distribution of two assets or portfolios will be bi-variate normal. In particular as a single security can be thought of as a one security

portfolio then the joint distribution of returns between the one security portfolio and any other security or portfolio will be bi-variate normal. An implication of bi-variate normalcy is that the conditional distribution of the two variables is linear.¹⁹ This allows the parameters of the conditional distribution to be estimated by least squares regression techniques.

Broadly following Jensen the formal incorporation of the MM into CAPM can be shown as follows.²⁰

Defining MM as;

$$\tilde{R}_{it} = E(\tilde{R}_{it}) + b_i \tilde{Q}_t + \tilde{\mu}_{it} \quad 4(viii)$$

where;

$$\tilde{Q}_t = \text{an element of return communality}$$

with;

$$\begin{aligned} E(\tilde{Q}_t) &= 0 & \text{Var}(\tilde{\mu}_{it}) &= \sigma^2(\tilde{\mu}_{it}) & \text{Cov}(\tilde{\mu}_{it}, \tilde{Q}_t) &= 0 \\ E(\tilde{\mu}_{it}) &= 0 & \text{Cov}(\tilde{\mu}_{it}, \tilde{\mu}_{jt}) &= 0 \end{aligned}$$

letting;

$$\tilde{R}_{mt} = E(\tilde{R}_{mt}) + \tilde{Q}_t \quad 4(ix)$$

substituting 4(ix) into 4(vi);

$$E(\tilde{R}_{it}) = R_f + \beta_{im} [\tilde{R}_{mt} - \tilde{Q}_t - R_f]$$

adding $\beta_{im} \tilde{Q}_t + \tilde{\mu}_{it}$ to each side;

$$\begin{aligned} E(\tilde{R}_{it}) + \beta_{im} \tilde{Q}_t + \tilde{\mu}_{it} &= R_f + \beta_{im} (\tilde{R}_{mt} - \tilde{Q}_t - R_f) + \beta_{im} \tilde{Q}_t + \tilde{\mu}_{it} \\ &= R_f + \beta_{im} (\tilde{R}_{mt} - R_f) + \tilde{\mu}_{it} \end{aligned}$$

19. T. Wannacott, R. Wannacott, "Introductory Statistics", Wiley, 1972, pp. 342-343.

20. M. Jensen "The Performance of Mutual Funds in the Period 1945-1964", Journal of Finance, 23, May 1968, pp. 389-416.

by allowing $b_i \approx \beta_{im}$ the LHS (from 4(viii)) becomes;

$$\tilde{R}_{it} = R_f + \beta_{im} (\tilde{R}_{mt} - R_f) + \tilde{\mu}_{it}$$

by rearranging;

$$(\tilde{R}_{it} - R_f) = \beta_{im} (\tilde{R}_{mt} - R_f) + \tilde{\mu}_{it} \quad 4(x)$$

Risk parameters can be estimated directly from equation 4(x) by ordinary least squares regression techniques. However it is usual to show 4(x) without the constant suppressed. That is;

$$(\tilde{R}_{it} - R_f) = \hat{\alpha}_i + \hat{\beta}_{im} (\tilde{R}_{mt} - R_f) + \tilde{\epsilon}_{it} \quad 4(xi)$$

where;

$$E(\tilde{\epsilon}_{it}) = 0 \quad \text{Var}(\tilde{\epsilon}_{it}) = \sigma^2(\epsilon_{it}) \quad \text{Cov}(\tilde{\epsilon}_{it}, \tilde{\epsilon}_{yt}) = 0$$

The relationship between the $\tilde{\mu}_{it}$ of equation 4(x) and $\tilde{\epsilon}_{it}$ of equation 4(xi) is;

$$\tilde{\mu}_{it} = \hat{\alpha}_i + \tilde{\epsilon}_{it}$$

Equation 4(xi) allows the direct estimation of the three risk measures derived above from ex post return data. However before going on to present the empirical estimates some comments are required on the application of equation 4(xi) in general and on the use of U.K. data in particular.

As we noted above the slope coefficient of equation 4(xi) is clearly assumed to be constant over the period under consideration. In practice however this may not be so. In fact there is no particular

reason to expect a company's beta to be constant. This may be particularly so for ITCs where market timing is considered to be one of the areas management possess skills in. Indeed in discussions with managers the construction of high beta portfolios in anticipation of bull markets and vice versa for bear markets is considered to be extremely important. There are three alternatives to accepting the stable beta assumption. The most complete is to formally model expected betas. The second is to attempt to isolate the periods over which beta can be considered to be relatively stable. The third method is very much a development of the second in that adjusted betas are calculated to overcome either or both expected elements of non-stationarity or sampling errors in the estimation procedure.

Although several authors have been tempted to explore the first alternative their efforts have not been met with great success.^{21,22,23}

In part this has been due to the statistical problems involved in deriving estimation procedures for non-stationary coefficients and partly to deciding precisely how to model beta. We cover this area in more detail when we deal with the market timing aspects of ITC performance. The second and third alternatives follow very much from the work of Blume.^{24,25} Working with U.S. data he reported evidence that indicated both beta non-stationarity and a tendency over time for betas to take on less extreme values. With regard to

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21. A. Dotan, A. Ofer, "Variable versus Stationary Beta in the Market Model". Paper presented to the European Finance Association", 1982.
 22. G. Harpaz, "A Bayesian Estimator for Non-Stationary Betas" Paper presented to the European Finance Association, 1982.
 23. F. Fabozzi, J. Francis "Beta as a Random Coefficient" *Journal of Financial and Quantitative Analysis*. March 1978, pp. 101-116.
 24. M. Blume, "On the Assessment of Risk", *Journal of Finance*, March 1971, pp. 1-11.
 25. M. Blume, "Betas and their Regression Tendencies", *Journal of Finance*, June 1975 (Reprinted in I. Friend & J. Bicksler, "Risk and Return in Finance" Vol.1, 1977)

the latter conclusion, based primarily on Blume's own work and that of Gonedes, Fama notes that beta can be considered as reasonably stable over periods of up to seven years.^{26,27} It must be noted however that any decision as to the "correct" estimation period over which betas are calculated does in itself imply a model of beta variability. As yet there is no evidence in the literature suggesting adequate financial justification for estimation periods of up to seven years.

The observation by Blume and others that beta values tend to moderate over time has led to the development of estimation procedures that attempt to account for this. The most obvious way to correct this tendency and indeed the one suggested by Blume is to regress the estimated betas of period t on the estimated betas of $t-1$ and to use this (estimated) relationship to adjust the beta estimates of period $t+1$. The accuracy of this technique clearly depends on the one period time series model utilised although it should be noted that Blume's estimates of future beta values were considerably more stable after adjustment. More sophisticated techniques have been developed to overcome both the "regression tendencies" of betas and the problem more acute at the individual security level of the standard errors attached to beta estimates. The use of Bayesian estimators of varying degrees of complexity provide estimates of individual security betas that statistically would appear to have both greater accuracy and more stability.^{28,29,30} Indeed many commercial beta services

26. N. Gonedes, "Evidence on the Information Content of Accounting Numbers: Accounting Based and Market Based Estimates of Systematic Risk", *Journal of Financial and Quantitative Analysis*, June 1973, pp. 407-444.

27. E. Fama, "Foundations of Finance", Oxford, 1978, p. 131.

28. E. Dimson, P. Marsh, "The Stability of UK Risk Measures and the Problem of Thin Trading" Presented to the European Finance Association, 1982.

29. O. Vasicek, "A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas", *Journal of Finance*, December 1973, pp. 1233-1239.

have in recent years adopted these techniques.^{31,32} However we suggest that no matter the degree of statistical sophistication these techniques undoubtedly possess they do imply that the so-called "true betas" are in fact stable and that adjustments are necessary to return inaccurate estimates to "true" values. In respect to general cross-sectional Bayesian adjustments we note Sharpe's conclusion that :

"Apparently betas not only vary over time but have a tendency to move back toward average levels. This is plausible enough, for extreme postures are likely to be moderated over time. A firm whose operation or financing make the risk of its equity considerably different from that of other firms is more likely to move back toward the average than away from it. Such changes in beta values are due to real economic phenomena, not simply an artifact of overly simple statistical procedures. There is however no reason to expect every stock's true beta to move in the same way, to the same average and at the same speed. In this regard a little fundamental security analysis may prove more useful than the adoption of more sophisticated statistical methods for processing past price changes." ³³

Our approach to the problem of beta estimation is likewise conservative. We examine whether or not beta estimates tend to be stable in successive periods but recalling the point noted above that beta may well be a variable that investment managers can actively change we do not make any attempt to improve the estimated stability.

We now turn to a problem more specifically relevant to risk estimation using U.K. data. As we noted in Chapter 3 a characteristic of the London Stock Exchange is the presence of non-trading. This results

30. M. Theobald, "An Analysis of the Market Model and Beta Factors using UK Equity Share Data", *Journal of Business Finance and Accounting*, Spring 1980, pp. 49-64.

31. London Business School, "Risk Measurement Service".

32. Merrill Lyndh Inc. "Security Risk Evaluation Service".

33. W. Sharpe, "Investments", New York, 1981, pp. 341-342.

in the covariance between security and market returns being based on observations that are not sourced from the same period. In particular security returns where non-trading is present will both start and finish in an earlier period to that covered by the surrogate for the market return. As we would expect and indeed as several authors have pointed out this leads to an under-estimation of the slope coefficient.^{34,35} Several authors have suggested ways round this problem.^{35,36,37} The approaches adopted by both Dimson and by Scholes and Williams involve attempts to correct for bias by using either leading or lagged market returns. For example Dimson estimates beta by running a multiple regression of security returns on various market observations based on time periods both before and after that of the security observation. By summing the resulting slope coefficients he determines an estimate of the beta relatively free of non-trading bias. Alternatively the approach offered by Dimson and Marsh is to calculate returns on a trade to trade basis for both individual securities and market returns. The key to the latter approach is that security price observations and market observations are recorded synchronously with the time between observations being treated as a variable rather than as a fixed number of elapsed days. Clearly the Dimson-Marsh method of risk estimation deals with the problem of non-synchronous return observations in a

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34. K. Cohen, S. Maier, R. Schwartz & D. Whitcomb, "On the Existence of Serial Correlation in an Efficient Securities Market", *TIMS Studies in the Management Sciences*, 1979, pp. 151-168.
 35. E. Dimson, "Risk Measurement when Shares are Subject to Infrequent Trading", *Journal of Financial Economics*, June 1979, pp. 197-226.
 36. E. Dimson, P. Marsh, "The Stability of UK Risk Measures and the Problem of Thin Trading" Presented to the European Finance Association, 1982.
 37. M. Scholes, J. Williams, "Estimating Betas from Non-Synchronous Data" *Journal of Financial Economics*, 5, 1977, pp. 309-327.

more straightforward way than the previous authors. Unfortunately it does involve additional costs both in terms of data collection and a more complex estimating equation.

As we noted in Chapter 3 the construction of our data base allows for the computation of synchronous trade to trade returns for individual securities and FTA-AS market returns.

The effect on the estimating equation 4(xi) of allowing elapsed time to act as a variable can be shown by first of all assuming the following return distribution:

Let

$$\tilde{r}_i \sim N(\mu, \sigma^2) \quad 4(xii)$$

where;

$$\tilde{r}_i = \text{continuously compounded daily excess total return with successive distributions iid.}$$

We can generalise 4(xii) to periods of more than one day;

$$\sum_{i=1}^T \tilde{r}_i = \tilde{R}_{it} \sim N(\mu T, T\sigma^2) \quad 4(xiii)$$

where;

$$\tilde{R}_{it} = \text{continuously compounded excess total return per period } t \text{ with successive distributions iid.}$$

$$T = \text{number of elapsed days in period } t.$$

As our ITC and market excess returns, where market is defined as the FTA-All Share Index, are synchronous equation 4(xiii) applies to both the independent and dependent variables in equation 4(xi). The

problem now is that as our basic model is in terms of daily returns and our observations are over elapsed periods of various numbers of days we require a distributional estimate of daily returns based on trade to trade observations.

The estimated daily variance can be calculated by noting that the variance of a constant times a random variable is the square of the constant times the variance of the random variable, i.e.

$$\begin{aligned}\text{Var } (\tilde{R}_{it}) &= T \text{Var } (\tilde{r}_i) \\ &= \text{Var } (\tilde{r}_i \sqrt{T})\end{aligned}$$

$$: \text{Var } (\tilde{R}_{it}/\sqrt{T}) = \text{Var } (\tilde{r}_i) \quad 4(\text{xiv})$$

In other words by weighting our trade to trade returns with the square root of elapsed time the variance of the resulting transformed variable will be an estimate of the variance, σ^2 , in our original "daily return" model. Our estimated daily distribution will therefore take the form ;

$$\tilde{R}_{it}/\sqrt{T} \sim N(\sqrt{T}\mu, \sigma^2)$$

Restating equation 4(xi) in terms of daily excess returns;

$$\tilde{r}'_{it} = \hat{\alpha}_i + \hat{\beta}_{im} \tilde{r}'_{mt} + \tilde{e}_{it} \quad 4(\text{xv})$$

where;

$$\tilde{r}'_{it} = \tilde{r}_{it} - r_f$$

$$\tilde{r}'_{mt} = \tilde{r}_{mt} - r_f$$

Summing over the number of elapsed days;

$$\sum_{i=1}^T \tilde{r}'_{it} = \sum_{i=1}^T \hat{\alpha}_i + \hat{\beta}_{im} \sum_{i=1}^T \tilde{r}'_{mt} + \sum_{i=1}^T \tilde{e}_{it} \quad 4(xvi)$$

From equation 4(xiii) we can imply that the variance of the error term in equation 4(xvi) will be proportional to the elapsed trade to trade time periods. As a result of this the estimates we get from the application of ordinary least squares will no longer be BLUE.

Two solutions to this estimating problem are available. First of all we could use weighted least squares procedures. In this case weighting would be by the square root of the elapsed time. Secondly we could transform the original variables and then run ordinary least squares procedures. The results will be the same whichever method is used. We chose the latter estimation procedure. From equation 4(xiv) the correct transformation to the trade to trade returns in order to make the error terms in 4(xvi) iid can be seen to be a weighting by the square root of the elapsed number of days. Therefore transforming equation 4(xvi) gives;

$$\sum_{i=1}^T \tilde{r}'_{it}/\sqrt{T} = \sum_{i=1}^T \hat{\alpha}_i/\sqrt{T} + \hat{\beta}_{im} \left[\sum_{i=1}^T \tilde{r}'_{mt}/\sqrt{T} \right] + \sum_{i=1}^T \tilde{e}_{it}/\sqrt{T}$$

which restated in trade to trade terms;

$$\tilde{R}'_{it}/\sqrt{T} = \hat{\alpha}_i/\sqrt{T} + \hat{\beta}_{im} \tilde{R}'_{mt}/\sqrt{T} + \tilde{\epsilon}_{it}/\sqrt{T} \quad 4(xvii)$$

where;

$$\begin{aligned} \tilde{R}'_{it} &= \tilde{R}_{it} - R_{f_t} \\ \tilde{R}'_{mt} &= \tilde{R}_{mt} - R_{f_t} \end{aligned}$$

Equation 4(xvii) now becomes our risk estimating equation which specifically takes into account the effect of using trade to trade returns. Note that we have also allowed the risk free rate to vary over differing return periods.

3. The Empirical Estimates : Before presenting our results it is useful at this stage to summarise the various estimating and presentation procedures adopted.

(a) Estimating Equation

$$\tilde{R}_{it}'/\sqrt{T} = \hat{\alpha}_i\sqrt{T} + \hat{\beta}_{im}\tilde{R}_{mt}'/\sqrt{T} + \tilde{e}_{it}/\sqrt{T}$$

where;

$$\tilde{R}_{it}' = (\text{Log } (((MC - M0 + XD) / M0) + 1)) - (R_{ft})$$

$$\tilde{R}_{mt}' = (\text{Log } (((FTC - FT0 + D) / FT0) + 1)) - (R_{ft})$$

$$R_{ft} = \text{Log}^* (((TB_{t-1}) / 12(1 - TB_{t-1}))) + 1)$$

with;

MC = Last mark of month t

M0 = Last mark of month t-1

XD = Gross dividend, added in at XD date

FTC = FTA-AS index at date of MC

FT0 = FTA-AS index at date of M0

TB = Annual equivalent of the 3 month treasury bill rate observed on the last Friday of each month. ³⁸

D = Dividend component of total market return defined as;
 $(DY)(FTC)/1200$

with DY = Observed yield on the FTA-AS index at FTC date

T = Total number of elapsed days between trades.

- (b) Estimated Measures; The following risk measures were calculated for 97 ITCs based on 118 trade to trade return observations between February 1971 and December 1980.

$$\begin{aligned}\text{Total Risk (t)} &= \hat{\sigma}(\tilde{R}'_{it} / \sqrt{T}) \\ \text{Market Risk (m)} &= \hat{\beta}_{im} \hat{\sigma}(\tilde{R}'_{mt} / \sqrt{T}) \\ \text{Unique Risk} &= \sqrt{t^2 - m^2}\end{aligned}$$

- (c) Presentation; In order to present the results in a more practical format the risk measures were converted into estimates of annual risk in terms of simple returns expressed in percentage form.

$$\begin{aligned}\text{i.e. Total Risk (T)} &= ((\text{Antilog}(\sqrt{365} \cdot \hat{\sigma}(\tilde{R}'_{it} / \sqrt{T}))) - 1) 100 \\ \text{Market Risk (M)} &= \hat{\beta}_{im} ((\text{Antilog}(\sqrt{365} \cdot \hat{\sigma}(\tilde{R}'_{mt} / \sqrt{T}))) - 1) 100 \\ \text{Unique Risk} &= \sqrt{(T^2 - M^2)}\end{aligned}$$

(The variance of the weighted market returns was approximately the same for all ITCs. Thus we have used an average. This was not the case when the means of the weighted market returns were considered. We discuss this point in detail in Chapter 5.)

Our results are summarised in Table 4(ii) and shown in greater detail for individual ITCs in Table 4(iii) pages 1/2 to 2/2.

Before looking at the results we note several statistical points in relation to the estimating equations.

- (i) The average coefficient of determination = .643
- (ii) The average Durbin-Watson "d" statistic = 2.55

TABLE 4(ii)

<u>Investment Trust Companies</u> <u>Equity Risk Measures - Summary</u> (%)			
Description	Average	Minimum	Maximum
Total Risk	38.483	30.406	70.711
Beta	0.945	0.686	1.378
"t"	14.807	9.270	22.102
"SE"	0.065	0.047	0.110
Market Risk	29.906	21.714	43.619
Unique Risk	24.220	15.475	55.654

The estimating equations are clearly reasonably good fits for the data. There is some slight evidence of negative autocorrelation with $|d| > 2.00$. To gain some idea of whether or not this level of autocorrelation seriously effected the efficiency of our estimators the equations were, following Theobald, re-estimated using the Cochrane-Orcutt procedure.³⁹ The differences were not in fact significant therefore our original methodology was retained.

39. M. Theobald, "An Analysis of the Market Model and Beta Factors Using U.K. Equity Share Data", Journal of Business Finance and Accounting, 7, 1980.

TABLE 4(iii) 1/2

Investment Trust Companies									
Equity Risk Measures									
Trust	Total T	Market		Unique $T^2 - M^2$	Trust	Total T	Market		Unique $T^2 - M^2$
		β_{im}	M				β_{im}	M	
Aberdeen Trust	36.523	.908	28.741	22.536	Continental Union	36.263	.947	29.976	20.406
Alliance Investment	42.111	.988	31.274	28.200	Drayton Commercial	35.226	.870	27.538	21.966
Alliance Trust	36.784	.862	27.285	24.669	Drayton Consolidated	34.710	.880	27.855	20.709
American Trust	42.655	1.041	32.951	27.085	Drayton Premier	34.453	.880	27.855	20.275
Anglo-American Securities	37.308	.973	30.799	21.054	Edinburgh Investment	35.743	.971	30.736	18.244
Anglo-Scottish	39.956	1.048	33.173	22.271	Electric & General	56.950	1.187	37.573	42.796
Ashdown	32.921	.802	25.386	20.960	English & International	41.569	.940	29.754	29.212
Atlantic Assets	70.711	1.378	43.619	55.654	English & New York	39.956	.891	28.203	28.303
Atlas Electric & General	42.832	1.017	32.192	27.566	English & Scottish	36.503	.941	29.786	20.228
Bankers	40.223	.931	29.469	27.376	Estate Duties	31.156	.716	22.664	21.378
Berry	45.406	.952	30.134	33.965	First Scottish American	39.956	.912	28.868	27.624
Bishopgate	34.197	.866	27.412	20.445	Foreign & Colonial	38.891	1.012	32.033	22.054
Border & Southern	35.743	.934	29.564	20.088	General Consolidated	37.308	.925	29.279	23.186
British American & General	41.840	.982	31.084	28.006	General Funds	37.308	.964	30.514	21.465
British Assets	45.406	1.158	36.655	26.797	General Investors	36.784	.879	27.792	24.097
British Investment	36.263	.929	29.406	21.220	General Scottish	34.968	.831	26.304	23.040
Broadstore	36.263	1.036	32.793	15.479	Glasgow Stockholders	37.308	.943	29.849	22.381
Brunner	37.308	.946	29.944	22.186	Globe	39.422	.915	28.963	26.743
Capital & National	37.308	.914	28.931	23.555	Great Northern	41.029	1.001	31.685	26.064
Cardinal	36.003	.929	29.406	20.772	Guardian	41.840	1.028	32.540	26.300
Cedar	38.097	.983	31.115	21.982	Hambros	38.361	.881	27.887	26.341
Charter Trust	37.046	.871	27.570	24.755	Philip Hill	41.029	1.029	32.571	24.950
Claverhouse	36.003	.955	30.229	19.555	Industrial & General	38.891	.979	30.989	23.498
CLRP	35.484	.789	24.975	25.206	International	39.689	1.100	34.819	19.048
Continental & Industrial	38.097	1.007	31.875	20.865					

/continued

Investment Trust Companies									
Equity Risk Measures									
Trust	Total T	Market		Unique $T^2 - M^2$	Trust	Total T	Market		Unique $T^2 - M^2$
		β_{im}	M				β_{im}	M	
Investors' Capital	38.422	.916	28.995	26.709	Scottish American	45.962	1.118	35.389	29.327
Keystone	32.921	.743	23.518	23.036	Scottish Eastern	38.361	.905	28.646	25.514
Lakeview	39.956	1.004	31.780	24.218	Scottish Investment	49.346	.914	28.931	39.975
London & Holyrood	33.941	.907	28.710	18.103	Scottish Mortgage	37.308	.852	26.969	26.969
London & Lomond	41.299	1.013	32.065	26.027	Scottish National	38.626	1.032	32.666	20.613
London & Montrose	33.430	.839	26.557	20.304	Scottish Northern	45.406	1.185	37.509	25.588
London & Provincial	39.689	.886	28.045	28.337	Scottish Ontario	37.308	.960	30.387	21.645
London Trust	39.156	.943	29.949	25.342	Scottish United	33.685	.708	22.411	25.148
Mercantile	42.665	1.006	31.843	28.395	Second Alliance	49.061	.984	31.147	37.905
Merchants	36.523	.895	28.330	23.050	Securities	36.784	.893	28.267	23.538
Monks	40.491	1.043	33.015	23.442	Sphere	39.422	1.047	33.141	21.348
Murray Caledonian	41.569	1.098	34.756	22.803	Sterling	32.162	.890	28.172	15.515
Murray Clydesdale	38.097	.897	28.393	25.401	Stockholders	41.569	1.063	33.648	24.408
Murray Northern	43.201	1.046	33.110	27.749	Throgmorton	36.523	.813	25.734	25.916
Murray Western	42.927	1.009	31.938	28.682	Trans Ocean	32.668	.842	26.652	18.886
1928	30.406	.794	25.133	17.113	Tribune	33.685	.719	22.759	24.833
North Atlantic Securities	33.430	.843	26.684	20.137	Trust Union	34.710	.959	30.356	16.831
Northern American	45.128	1.028	32.540	31.267	Trustees Corporation	37.046	1.029	32.571	17.650
Outwich	39.956	.871	27.570	28.920	UBS	34.197	.858	27.159	20.780
Pentland	38.626	1.057	33.458	19.301	US & General	37.046	1.057	33.458	15.904
Raeburn	40.491	.959	30.356	26.802	US Debenture	34.710	.865	27.380	21.333
Romney	38.361	1.022	32.350	20.616	Winterbottom	33.175	.871	27.570	18.451
RIT	34.453	.686	21.714	26.749	Witan	40.760	.964	30.514	27.023
St. Andrew	31.910	.786	24.880	19.980	Yeoman	37.308	1.009	31.938	19.283

Apart from the odd outlier the results for the individual ITCs are remarkably similar. Indeed the majority of the estimated risk parameters cluster fairly closely to their respective averages. The beta coefficients are all statistically significant, have small standard errors and average close to one with 31 greater than unity and 66 less. This result is very much in line with those reported in similar studies. In Table 4(iv) we report the market risk coefficients found by a selection of other authors. In each case the beta was computed against the return on the domestic market.

It does appear from both our reported results and those of the other authors noted that lower market coefficients are experienced by mutual funds and unit trusts as compared to those of closed end funds or ITCs. We return to this area in Chapter 6.

With betas close to unity and R^2 s averaging .64 there is a clear suggestion that ITC ownership implies holding asset claims which result in investors taking on both the market risk and significant amounts of diversifiable risk. We note in passing that the average standard deviation of the weighted market returns is reported as 31.65% p.a. whereas the average total risk of the ITC sample is greater at 38.48% p.a. Interestingly there is some evidence that this level of total risk is in part the result of equally weighting small and large ITCs in the presentation of our average results. Recall Table 3(iv) where we reported that the market weighted FTA-ITC index had a slightly lower level of total risk than that for the FTA-AS index. This result has considerable appeal in that small ITCs are more likely to be specialised investment vehicles than their larger more diversified counterparts.

TABLE 4(iv)

Reported Market Risk Coefficients		
Author	Sample	Beta
1. U.S. :		
McDonald ⁴⁰	123 Mutual Funds 1960-69	0.87
Jensen ⁴¹	115 Mutual Funds 1955-64	0.84
Mains ⁴²	70 Mutual Funds 1955-65	0.79
Thompson ⁴³	23 Closed Funds 1940-75	1.00
Smith & Tito ⁴⁴	38 Mutual Funds 1958-67	0.85
2. FRANCE:		
McDonald ⁴⁵	8 Mutual Funds 1964-69	0.38
3. U.K.:		
Moles & Taylor ⁴⁶	86 Unit Trusts 1965-75	0.67
Corner & Matatko ⁴⁷	92 ITCs 1974-79	0.94
Ward & Saunders ⁴⁸	49 Unit Trusts 1964-74	0.88
Firth ⁴⁹	72 Unit Trusts 1966-75	0.68

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40. J. McDonald, "Objectives and Performances of Mutual Funds 1960-69", Journal of Financial and Quantitative Analysis, June 1974.
41. M. Jensen, "Risk, The Pricing of Capital Assets and Evaluation of Portfolios", Journal of Business, April 1969.
42. N. Mains, "Risk, The Pricing of Capital Assets and Evaluation of Portfolios - A Note", Journal of Business, July 1977.
43. R. Thompson, "Closed End Funds Discount and Efficiency", Journal of Financial Economics, 1978.
44. K. Smith & D. Tito, "Risk, Return Measures of Ex Post Portfolio Performance", Journal of Financial and Quantitative Analysis, 1969.
45. J. McDonald, "French Mutual Fund Performance: Evaluation of Internationally-Diversified Portfolios", Journal of Finance, December 1973.
46. P. Moles, B. Taylor, "Unit Trust Risk-Return Performance 1966-1975", Investment Analyst. 1978.
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Indeed the size of the funds under management by several of the largest ITCs may well preclude significant specialisation.

4. The Management of Risk: The investment implications of CAPM allow managers very little room in which to pursue active management policies. Indeed with fully diversified portfolios and efficiently priced securities the level of market risk is from a theoretical point of view virtually the only operational variable fund managers should adjust. Although we hasten to add that such adjustments would not under CAPM result in profitable market timing activities. Rather they should reflect changes in the desired level of risk exposure on the part of fund investors. With this in mind what is of interest to investors is whether or not management are in fact meeting the risk objectives they advertise.

The performance differentials associated with actual and promoted risk levels within the context of efficiently diversified CAPM benchmark portfolios can be defined as follows;

Let B_{TM} = the investors target level of risk
 B_{AM} = the manager's achieved level of risk
 R_A = the return associated with risk B_{AM}
 R_T = the return associated with risk B_{TM}
 R_m = the return on the market portfolio
 R_f = the return on the risk free asset

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47. D. Corner & J. Matatko, "Investment Trust Portfolio Performance - Measurement and Determinants", Investment Analyst
 48. C. Ward, & A. Saunders, "Unit Trust Performance 1964-74", Journal of Business Finance and Accounting, 1976.
 49. M. Firth, "The Investment Performance of Unit Trusts in the Period 1965-75", Journal of Money, Banking and Credit, 1977.

then the additional return required by the manager to compensate his shareholders for the risk level he has in fact taken on will be;

$$R_A - R_T = R_f + \beta_{AM} (R_m - R_f) - R_f - \beta_{TM} (R_m - R_f)$$

$$R_A - R_T = (\beta_{AM} - \beta_{TM}) (R_m - R_f) \quad 4(xviii)$$

We should also note that by involving themselves in the equity market investors are showing that they themselves are willing to take on some risk. The return for this risk is;

$$R_T - R_f = \beta_{TM} (R_m - R_f) \quad 4(xix)$$

The above analysis turns on the assumed target levels of risk.

Unfortunately target levels of risk are unobservable and therefore we must attempt to assess management ability to control risk with a less direct methodology.

We noted in Chapter 1 that it is currently well accepted that ITC managers should help investors differentiate between ITCs by publically stating investment objectives. These objectives traditionally turn on distinguishing those ITCs that provide their returns predominantly through dividend distributions from those whose investors can hopefully expect capital gains. As an income stream can be secured with relatively little risk the former strategies can be hypothesised as relatively less risky than the latter strategies. Using this stated income-capital distinction the question is whether or not these objectives are reflected in the risk profiles actually adopted by management. If management is successful at controlling risk we would expect to see those ITCs with income objectives associated with low risk levels and vice versa for ITCs with capital objectives.

Several authors have reported evidence showing that such a relationship does in fact exist. We summarise the results from a selection of authors in Table 4(v).

A common problem amongst all work of this kind is in the vagueness with which many managers state their chosen objectives. This point was noted in Chapter 1. In an attempt to avoid this difficulty and to offer a more direct estimate of objectives annual average gross yields were calculated on the portfolio assets of the data base ITCs. These were then grouped into high, medium and low yield categories. Staff at Grieson Grant & Co. were then asked to confirm that the constituent companies in the three groups were correctly allocated in terms of managements known and accepted objectives. Apart from eight ITCs the allocation was accurate. The average yields, together with the average equity betas and standard deviations are shown in Table 4(vi).

The reported negative relationship between grouped portfolio yields and grouped risk levels confirms the general conclusion of earlier work that managers are in fact reasonably successful in meeting their risk objectives. However looking at the standard deviations around the risk estimates it is clear that there is substantial overlapping between the yield groupings. Thus while yield grouping procedures may be useful in highlighting a relationship between objectives and risk the statistical significance of the relationship may be weak. The results of the following regression runs are revealing.

TABLE 4(v)

The Management of Risk									
Reported Empirical Evidence									
U.K.					U.S.				
Author	Period	Income	Balanced	Capital	Author	Period	Income	Balanced	Capital
1 <u>Ward & Saunders</u> ⁵⁰	1976-1974				1 <u>Jensen</u> ⁵²	1955-1964			
β_{im}		.783	.898	.959	β_{im}		.659	.856	.955
$G(R_i)$		.030	.037	.052	$G(R_i)$		N/A	N/A	N/A
(Log Annual)					(Log (Cum))				
2 <u>Moles & Taylor</u> ⁵¹	1966-1975				2 <u>McDonald</u> ⁵³	1960-1969			
β_{im}		.709	.716	.688	β_{im}		.615	.880	1.115
$G(R_i)$		.185	.187	.184	$G(R_i)$		2.860	3.865	5.235
(Log $\frac{1}{2}$ Annual)					(% monthly)				

Notes : 1. The results of the various authors have been summarised and in the case of Jensen grouped.

50. C. Ward, A. Saunders, "U.K. Unit Trust Performance 1964-74" Journal of Business Finance and Accounting, 3, 1976.

51. P. Moles, B. Taylor, "Unit Trust Risk-Return Performance - 1966-1975", The Investment Analyst, 1978.

52. M. Jensen, "Risk, The Pricing of Capital Assets and the Evaluation of Investment Portfolios", Journal of Business, 1969, pp.587-615.

53. J. MacDonald, "Objectives and Performance of Mutual Funds", Journal of Financial and Quantitative Analysis, 3, 1974.

TABLE 4(vi)

<u>Investment Trust Companies</u> <u>Risk Management</u> (% p.a.)			
Yield Group	Average Yield	Average β_{im}	Average $6(\tilde{R}_i)$
High Yield	4.083 (.696)	.903 (.064)	37.239 (2.801)
Medium Yield	3.096 (.146)	.956 (.082)	38.521 (3.923)
Low Yield	2.303 (.485)	.966 (.147)	40.721 (7.652)

Notes :

1. The December portfolio market valuations for the full 97 ITCs were made available by Grieveson Grant & Co.
2. Standard deviations are shown in parenthesis.

$$\tilde{\beta}_{im} = 1.067 - 0.039 \tilde{Y}_i \quad R^2 = .104$$

("t" = -3.26)

$$\tilde{S}_i = 45.805 - 2.209 \tilde{Y}_i \quad R^2 = .128$$

("t" = -3.69)

where;

$$i = 1 \dots 97$$

$\tilde{\beta}_{im}$ = Market risk component on the i^{th} security

\tilde{Y}_i = Yield on the i^{th} security

\tilde{S}_i = Standard deviation of the i^{th} security.

While confirming a statistically significant relationship between yield and risk these results do however indicate the overall weakness of the relationship. Portfolio yields would appear to be a significant although small determinant of equity risk levels.

It may well be that it is unrealistic to expect managers to commit themselves to stationary risk objectives. If this is the case then it would go some way to explaining the weak relationships noted in the above regressions. As we have noted several times varying risk levels is in practice an important management tool. To see the extent to which beta and total risk levels varied during the 1970s the 118 month period was split into two equal halves and beta coefficients were calculated for each ITC for the two periods. The average betas and standard deviations together with the Spearman rank order correlation coefficients between the two periods are reported in Table 4(vii).

TABLE 4(vii)

<u>Investment Trust Companies</u> <u>The Consistency of Risk Measures</u> (97 ITCs) (p.a.%)		
Description	Total Risk	Beta
Period 1 : 59 months to 1/76 Average	33.33	0.955
Period 2 : 59 months to 12/80 Average	19.20	0.920
Spearman Rho	0.470	0.149

While the general movement in risk levels between the two periods is broad confirmation of our results on distributional stability reported in Chapter 3 what is of particular interest is the very small ranking relationship between the two periods for market risk levels. It is clear that ITCs do not offer stable levels of exposure to market risk although they do offer considerably more stability in terms of total risk. These results are very much in line with the results reported for unit trusts and ITCs in the U.K. (Ellis and Moles and Taylor) although they differ significantly from both the U.K. results for equities as a whole reported by Dimson and Marsh and from U.S. results. (Jensen, Blume, Pogue, Conway & Levy).^{54,55,56,57,58,59,60}

We suggest that the relative ease with which ITC managers can alter gearing levels or portfolio holdings together with the often heard comments about the importance of market timing strongly imply that risk levels are in practice a key operating variable and that to assume that they are stable over all but relatively short periods of time is dangerous. In the context of the results reported in Table 4(v) this would certainly appear to be the case with different managers substantially altering their market risk exposure during the second half of the decade. Interestingly at the same time they showed rather less willingness to change their relative levels of total risk. We return to the question of market timing in Chapter 5.

In Chapter 1 and at several points in the subsequent chapters we noted that a possible ITC intermediation product may well be the provision of a diversified portfolio at a cost less than that available to investors operating individually. If ITCs are to provide this product then it is clearly important to assess the success with which they repackage returns into income streams that are highly correlated with the market. It is to this question

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54. P. Ellis, "Beta Coefficients for Investment Trusts", *Investment Analyst*, December 1974.
 55. P. Moles, B. Taylor, "Unit Trust Risk-Return Performance 1966-75" *Investment Analyst*. 1978.
 56. E. Dimson, P. Marsh, "The Stability of U.K. Risk Measures and the Problem of Thin Trading" Paper presented to the annual meeting of the E.F.A. - Jerusalem, 1982.
 57. M. Jensen, "Risk, The Pricing of Assets and the Evaluation of Investment Portfolios", *Journal of Business*. April 1969.
 58. M. Blume, "On the Assessment of Risk", *Journal of Finance*, March 1971.
 59. G. Pogue, W. Conway, "On the Stability of Mutual Fund Betas", unpublished MIT Working Paper. Quoted in W. Sharpe, "Investments" Prentice-Hall, 1981, p.519.
 60. R. Levy "On the Short Run Stationarity of Beta Coefficients", *Financial Analysts Journal*, December 1971, pp. 55-62.

that we now turn.

We approach diversification under three sub-headings. First of all we examine the importance of diversification within the context of CAPM. Secondly we provide an empirical estimate of diversification and thirdly we provide some empirical results.

- (i) The Potential Gains from Diversification: Earlier in this chapter we divided the risk of a security in the following manner. (See equation 4(v))

$$\text{Var} (\tilde{R}_i - R_f) = \beta^2 \text{Var} (\tilde{R}_m - R_f) + \text{Var} (\epsilon_i) \quad \text{see 4(v)}$$

At the portfolio, rather than the individual security level the market risk component can be obtained fairly easily by first summing;

$$\beta_{pm} = \sum_{i=1}^N x_i \beta_{im} \quad 4(xx)$$

where;

x_i = the weight of security i in portfolio p

β_{im} = the individual security betas.

Equation 4(xx) can be applied to the observed market risk to give the estimated market risk component of the portfolio.

Unfortunately the non-market risk term can't be so easily summed as it will contain both the non-market components of the individual securities and any correlations between them;

$$\text{i.e. } \text{Var} (\epsilon_p) = \sum_{i=1}^N \sum_{j=1}^N x_i x_j \rho_{ij} \epsilon_i \epsilon_j \quad 4(xxi)$$

where;

$x_i x_\gamma$ = the respective security weightings

$\rho_{i\gamma}$ = the correlation coefficient between securities
i and γ

$\sigma(\epsilon_i)\sigma(\epsilon_\gamma)$ = the non-market risk components of securities i and γ

Under CAPM the non-market elements in the returns of individual securities are unique to those securities. In other words there are no common elements left in the correlation matrix of returns after the market component has been removed. Therefore assuming independence in the non-market risk components equation 4(xxi) reduces to;

$$\text{Var}(\epsilon_p) = \sum_{i=1}^N x_i^2 \sigma^2(\epsilon_i)$$

Further if we let the portfolio weights be equal then;

$$\begin{aligned} \text{Var}(\epsilon_p) &= \sum_{i=1}^N \left(\frac{1}{N}\right)^2 \sigma^2(\epsilon_i) \\ &= \frac{1}{N} \bar{\sigma}^2(\epsilon_i) \end{aligned} \quad 4(\text{xxii})$$

Clearly as the number of securities in the portfolio increases the non-market risk contribution decreases. However it is essentially an empirical question as to the number of securities that must be included in a portfolio before the individual elements of non-market risk, and therefore in terms of CAPM unrewarded risk, can be diversified away.

The most widely quoted study in this area is the work by Wagner and Lau.⁶¹

61. W. Wagner & S. Lau, "The Effect of Diversification on Risk", Financial Analysts Journal, November 1971, pp. 48-53.

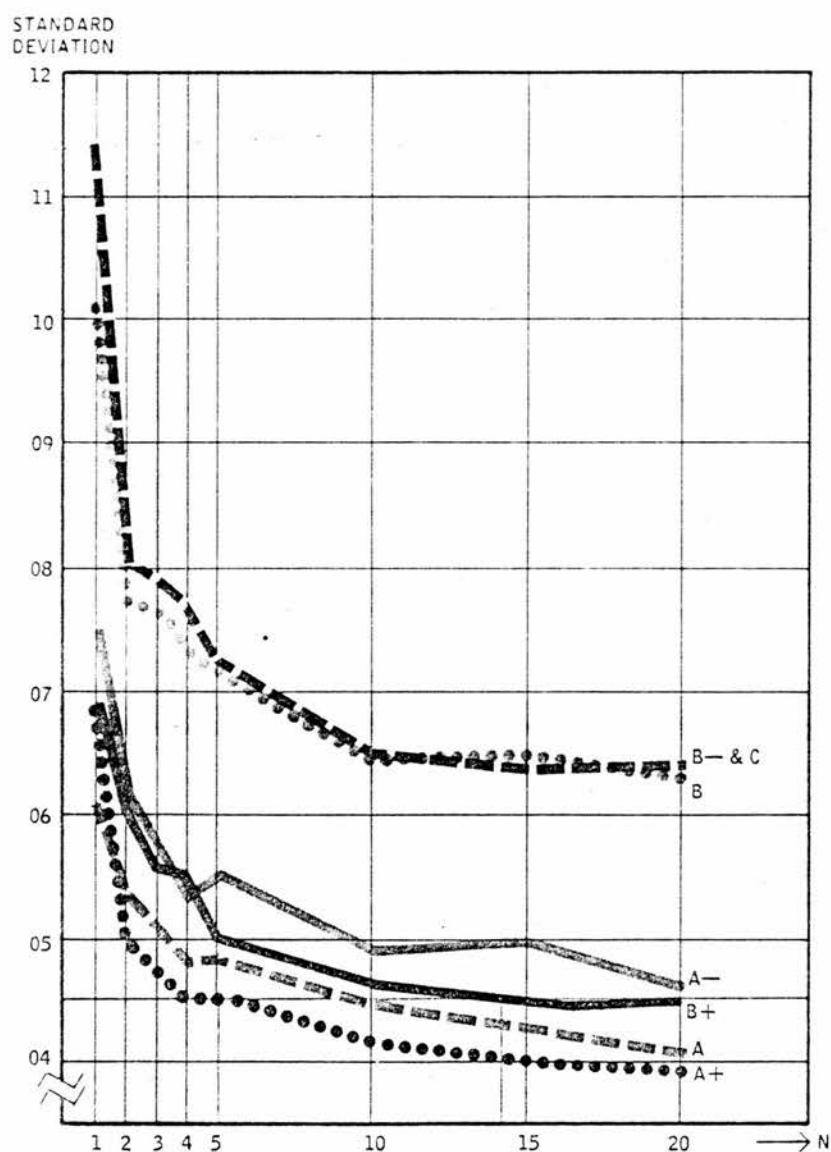
Working with the monthly returns from 200 NYSE securities between 1960 and 1970 the authors grouped the securities by quality ratings (A+, A, A-, B+, B-, B/C) and then formed randomly selected portfolios of between 1 and 20 securities. Monthly portfolio returns were calculated. This procedure was repeated ten times and the risk and return results were averaged. We reproduce their graph of portfolio total risk and number of securities below;

GRAPH 4(iv)

Wagner and Lau

Standard Deviation and Number of Securities

Average Results for Six Sub-Groups Based on Quality Ratings



What is apparent from Graph 4(iv) is that not only does the number of securities significantly effect portfolio risk but that substantial risk reduction can be achieved by a relatively modest number of additions to the portfolio. Indeed with reference to sub-group A they note the following.

TABLE 4(viii)

<u>Wagner and Lau</u> <u>Risk Return and Portfolio Size</u>		
No. of Securities	Average Monthly Return (%)	Standard Deviation of Return (%)
1	0.88	7.0
2	0.69	5.0
3	0.74	4.8
4	0.65	4.6
5	0.71	4.6
10	0.68	4.2
15	0.69	4.0
20	0.67	3.9

While portfolio returns remain virtually the same the addition of extra securities reduces total risk very considerably. The reduction is approximately 34% by the time 5 securities have been added and 44% by the time the portfolio size is 20. In the context of ITCs while we noted in Chapter 1 that the number of constituent securities in portfolios declined during the nineteen seventies the average portfolio size in 1980 was still

216 securities.

- (ii) An Empirical Estimate of Diversification: In the context of CAPM the value-weighted ex ante market portfolio is by definition perfectly diversified therefore the extent to which the returns on a security mirror those of the market can be interpreted as a measure of the degree of diversification obtained through holding that security.

Recall that our basic risk estimating equation 4(xvii) related ITC returns to market returns. The closeness of this relationship can be assessed by R^2 , the coefficient of determination which measures the proportion of the total variation in the dependent variable explained by the regression model. We therefore adopt this statistic as our measure of diversification.

Given the assumed importance of diversification to the ITC sector we would expect to find reasonably high R^2 s. In Table 4(ix) we report a selection of received evidence in this area.

Unfortunately very few authors specifically report the R^2 statistic. However the levels of diversification achieved by mutual funds and unit trusts are generally considered to be in range noted in Table 4(ix). It is clear that the market component underlying these returns accounts for a significant proportion of the individual fund return variation.

Table 4(ix)

<u>Diversification</u> <u>Reported Results</u> (R^2)		
Author	Sample	R^2
1. U.S.:		
Jensen ⁶²	115 Mutual Funds 1960-69	.865
Merrill Lynch ⁶³	100 Mutual Funds 1970-74	.841
2. U.K.:		
Firth ⁶⁴	72 Unit Trusts 1966-75	.838
Moles & Taylor ⁶⁵	86 Unit Trusts 1965-75	.800

(iii) Empirical Results: Coefficients of determination were calculated for the 97 data base ITCs based on the regression equation described by equation 4(xvii). The results are reported in Table 4(x).

62. M. Jensen, "Risk, The Pricing of Capital Assets and Evaluation of Portfolios", Journal of Business, April, 1969.

63. Merrill Lynch, Pierce, Fenner & Smith, "Investment Performance Analysis" in Sharpe, "Investments", Prentice-Hall, 1981, p.520 (adapted)

64. M. Firth, "The Investment Performance of Unit Trusts in the Period 1965-75" Journal of Money, Banking and Credit, 1977.

65. P. Moles, B. Taylor "Unit Trust Risk-Return Performance", 1966-75, Investment Analyst. 1978.

TABLE 4(x1)

Investment Trust Companies									
Diversification (R^2)									
(118 month period to 12/80)									
Trust	R^2	Trust	R^2	Trust	R^2	Trust	R^2	Trust	R^2
Aberdeen Trust	.658	Cedar	.702	General Scottish	.594	Murray Caledonian	.766	Scottish United	.457
Alliance Investment	.614	Charter Turst	.553	Glasgow Stockholders	.674	Murray Clydesdale	.620	Second Alliance	.472
Alliance Trust	.550	Claverhouse	.665	Globe	.600	Murray Northern	.649	Securities	.616
American	.659	CLRP	.505	Great Northern	.694	Murray Western	.593	Sphere	.756
Anglo-American Sec.	.710	Continental & Indus.	.732	Guardian	.671	1928	.640	Sterling	.695
Anglo-Scottish	.705	Continental Union	.698	Hambros	.616	North Atlantic Sec.	.635	Stockholders	.693
Ashdown	.630	Drayton Commercial	.656	Philip Hill	.714	Northern American	.609	Throgmorton	.546
Atlantic Assets	.506	Drayton Consol.	.673	Industrial & Gen.	.668	Outwich	.500	Trans-Ocean	.629
Atlas Electric & Gen.	.646	Drayton Premier	.649	International	.758	Pentland	.804	Tribune	.428
Bankers	.553	Edinburgh Investment	.781	Investors' Capital	.612	Raeburn	.622	Trust Union	.758
Berry	.498	Electric & General	.495	Keystone	.501	Romney	.710	Trustees Corp.	.790
Bishopgate	.650	English & Internat.	.596	Lakeview	.710	RIT	.425	UBS	.655
Border & Southern	.702	English & New York	.555	London & Holyrood	.678	St. Andrew	.617	US & General	.717
Brit. American & Gen.	.608	English & Scottish	.654	London & Lomond	.647	Scottish American	.676	US Debenture	.672
British Assets	.732	Estates Duties	.549	London & Montrose	.690	Scottish Eastern	.613	W'bottom	.734
British Investment	.676	First Scottish Am.	.605	London Provincial	.532	Scottish Investment	.427	Witan	.636
Broadstone	.808	Foreign & Colon.	.719	London Trust	.680	Scottish Mortgage	.577	Yeoman	.787
Brunner	.671	General Consol.	.637	Mercantile	.638	Scottish National	.740		
Capital & National	.695	General Funds	.666	Merchants	.614	Scottish Northern	.769		
Cardinal	.650	General Investors	.635	Monks	.732	Scottish Ontario	.700		

With approximately 64% of return variations being accounted for by market wide movements there is still a considerable proportion unaccounted for. We noted a similar finding in Chapter 3 where we loosely ascribed much of the balance to an industry effect. Indeed after including the industry effect an R^2 of .77 was recorded. Just what constitutes an industry effect is difficult to establish. Undoubtedly foreign investments, domestic assets not reflected in the FTA-AS index and portfolio weightings that are different from market value weights will be among the main contenders under this general "industry effect" heading. The question of foreign investment is one we dealt with in Chapter 2. However it does have particular relevance to the concept of diversification. Indeed to the extent that returns on different domestic markets are not perfectly correlated then an internationally diversified portfolio has the potential of diversifying away domestic market risk. The extent to which this may be possible is in fact surprisingly large. Lessard has shown that only 17% of the variance on his U.K. security index can be accounted for by a world index.⁶⁶ ITCs very often make a significant play on the fact that they can capitalise on these potential gains. However in spite of an average some 30% of the sector's assets being non-U.K. we noted earlier that the average total risk of the sector was greater than that for the U.K. market. When this is considered in relation to an average sector beta of slightly less than unity it is not clear that ITCs were benefitting from the risk reducing effects of international diversification. Following Lessard it may well be that a far larger international component is required to exploit the risk reducing potential of international diversification. Alternatively it may have been that the beneficial effects were being lost through security selection and portfolio weighting strategies.

66. D. Lessard, "World, Country and Industry Relationships in Equity Returns: Implications for Risk Reduction Through Diversification". Financial Analysts Journal, 32, 1976.

A further insight into the levels of diversification achieved by ITCs during the 1970s can be noted from a comparison of the R^2 s recorded in the first and second halves of the decade. The average in the first half is reported as .721 while that of the last five years was .531. In addition the Spearman rank order correlation coefficient between the two periods was .126. These results reflect both a substantial reduction in levels of diversification and a considerable change in the levels of diversification achieved by individual ITCs. Interestingly by relating these results to points noted in Chapter 1 we can hypothesise underlying explanations.

The 1970s was a period of intense pressure for the sector culminating as it did in various take-overs during the mid years of the decade. The pressure resulted from the combination of high interest rates which precluded ITCs from their post-war strategies of market timing through leveraging large "market" type portfolios in anticipation of bull markets and the severity of the bear markets which reduced the attractiveness of equity participation in portfolios primarily consisting of equities.

The alternative strategy increasingly adopted in the latter part of the decade involved specialisation and security selection and can be interpreted as the results of strong feelings on the part of many ITC managers to be "seen to be managing". The removal of exchange controls in late 1979 allowed an international perspective to be added to this strategy. Such changes together with varying rates of adoption by different ITCs would clearly lead to falling levels of diversification and ranking changes.

Summary: In this chapter we have rather uncritiquely adopted CAPM as the basis for our analysis of the risks involved in owning ITC equities. However the CAPM approach is not without criticism and indeed we discuss these criticisms and their effects in Chapter 5. To the extent that these criticisms are valid our results are somewhat weakened.

With these points in mind we reported estimates of total market and residual risk measures based on a methodology specifically devised to account for the problems of non-trading discussed in Chapter 3. In particular we noted an average level of total risk greater than that on the market as a whole, a level of market risk characterised by an average beta of slightly less than unity and a level of diversification perhaps slightly less than we might have expected given the received results on U.S. Mutual Funds and U.K. Unit Trusts.

Finally we examined the consistency with which ITCs maintained risk levels in terms of reflecting management objectives and inter-period stability. We reported a weak but significant negative relationship between yield and equity risk levels. However while the average market risk coefficients were similar in both periods the coefficients at the individual ITC level were notably non-stationary perhaps indicating the importance of market timing to ITC managers. Levels of diversification were neither on average nor individually stationary between the first and second halves of the decade. We suggested that this could be explained in terms of the changes in investment philosophy that were filtering through the sector during the second half of the decade.

CHAPTER FIVE

THE PERFORMANCE OF INVESTMENT TRUST COMPANIES

1971 - 1980

Introduction

Section 1 Measures of Investment Performance

Section 2 Empirical Results

Section 3 Market Timing

Section 4 Investment Performance - A critique

Section 5 The Relationship between Size and
Performance

Summary

INTRODUCTION : Our objective in this chapter is to review the performance of ITCs during the 1971-1980 period. We do this within the CAPM framework established in Chapter 4. However we do recognise that this approach has over the past three or four years come under increasing scrutiny. Unfortunately there is as yet no real alternative theoretical model of equilibrium pricing that is as useful as CAPM. The Arbitrage Pricing Theory (APT) which we noted briefly in Chapter 3 and which many authors consider an alternative and less restrictive model is because of its very generality only of limited usefulness. It would however be incomplete not to describe this alternative model in more detail and indeed in our Section 4 critique of performance measures we cover this topic. In Section 5 we present an application of APT to performance measurement when we report empirical work on the relationship between size and performance.

Investment performance is concerned with identifying levels of performance either in relation to a peer group or in relation to some exogenous and objective standard of assessment. It is clearly insufficient to state that a particular ITC achieved a certain level of return without at the same time relating this achieved performance to some measurement criteria. To be useful such criteria must be equally applicable to all ITCs. In addition they must be receptive to the intermediation services actually being provided.

We noted in Chapter 1 that ITC managements could adopt several investment strategies in attempting to provide services based on the production of superior price sensitive information and the exploitation of the possibility that different market participants were faced with different transaction cost functions. In regard to this latter service the strategy of

providing diversified portfolios is perhaps the most applicable.

We covered diversification in Chapter 4 and noted that although ITC equity ownership gave access to return flows closely related to those of the market the relationship was by no means complete.

Two other strategies were noted in Chapter 1. These involved security selection and market timing and both are perhaps best considered as strategies based on attempts to produce superior price sensitive information although clearly the production process must be cost competitive. In Chapter 4 the reported lack of stationarity in risk levels suggested that ITCs were actively attempting to time the market while the rising levels of specific risk suggested increasing attempts at security selection. There is of course nothing inconsistent in ITCs attempting to follow a hybrid strategy of both timing and selection. Indeed from discussions with managers it is apparent that such a hybrid approach is common place. In practice this involves a continuous search for new investment opportunities combined with timing decisions based not strictly on leverage given the cost of borrowing but on the degree to which portfolios should be fully funded or otherwise in equities.

Where possible then we wish to develop and use performance measures that will; allow the comparison of performance against an objective benchmark, facilitate relative rankings to be made between different ITCs and be receptive to the intermediation services being provided. We note at the outset that such a task is difficult and indeed the results are not above controversy.

1. Measures of Investment Performance : Given the risk return framework we developed in Chapter 4 it is clear that risk averse investors will require premiums over and above the return on the risk free asset as compensation for holding risky assets. Translated into terms of performance assessment then both the return premiums achieved for particular levels of risk or the return premiums earned per unit of risk provide assessment statistics. The latter measure is clearly more restrictive in terms of inter-firm comparisons as it fails to take account of different levels of risk exposure.

Three measures of performance two concerned with reward to risk ratios and one with the absolute measure of performance are widely used and we deal with each in turn.

- (a) Treynor Index of Volatility¹
- (b) Sharpe Index of Variability^{2,3}
- (c) Jensen Performance Statistic (γ)⁴

(a) Treynor Index of Volatility : This is defined as;

$$T = (\bar{R}_{pt} - R_f) / \beta_{pm} \quad 5(i)$$

where;

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- 1. J. Treynor, "How to Rate Managements of Investment Funds", Harvard Business Review, 43, 1965, pp. 63-75.
 - 2. W. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk", Journal of Finance, 19, 1964, pp.425-444.
 - 3. W. Sharpe, "Mutual Fund Performance", Journal of Finance, 39, 1966, pp. 119-138.
 - 4. M. Jensen, "Risk, The Pricing of Capital Assets and the Evaluation of Investment Portfolios", Journal of Business, 42, 1969, pp. 116-247.

T = Treynor index

\bar{R}_{pt} = Average return on portfolio p

R_f = Return on the risk free asset

B_{pm} = Market risk coefficient for portfolio p.

By weighting the ex post returns with the market risk coefficient the Treynor index is strictly only relevant to the world of well diversified portfolios. However as we noted in Chapter 1 a considerable proportion of the ITC equity ownership group is made up of institutional investors who may well consider the marginal risk attached to an ITC stake more important than the total risk. To these investors weighting excess returns by the market risk will be relevant. However the usefulness of this measure to those investors who don't hold well diversified portfolios is reduced by the extent of any elements of diversifiable risk underlying achieved returns. A further weakness in the measure is that there is an implicit assumption that over an assessment period a unique level of risk is relevant to each ITC. Thus to the extent that managers attempt to alter levels of market risk exposure it may be difficult to identify a unique weighting factor.

(b) Sharpe Index of Variability; This is defined as;

$$S = (\bar{R}_{pt} - R_f) / \sigma(R_{pt}) \quad 5(ii)$$

where

S = Sharpe Index

\bar{R}_{pt}, R_f = as before

$\sigma(\bar{R}_{pt})$ = Total risk (standard deviation) of portfolio p.

The Sharpe index replaces the market risk coefficient of the Treynor Index with the total risk of the security or portfolio. Such a measure would be relevant to those ITC equity holders who do not already hold diversified portfolios. For example the individual investor whose holdings of risky assets are confined to a very small number of investments. However like the Treynor index it also suffers from the risk stationarity assumption.

Whether or not we consider performance in relation to diversified or non-diversified portfolios is unfortunately a non-trivial matter.^{5,6} Indeed it is clear that only under certain strict conditions will the two measures give the same rankings. These conditions can be shown as follows;

Defining;

$$\beta_{pm} = \text{Cov}(R_{pt}, R_{mt}) / \sigma^2(R_{mt})$$

Multiply through by $\sigma(R_{mt}) / \sigma(R_{pt})$

$$\therefore \beta_{pm} \cdot \sigma(R_{mt}) / \sigma(R_{pt}) = [\text{Cov}(R_{pt}, R_{mt})] \cdot \sigma(R_{mt}) / \sigma(R_{pt})$$

$$\therefore \beta_{pm} = \rho(R_{pt}, R_{mt}) \cdot \sigma(R_{pt}) / \sigma(R_{mt}) \quad 5(iii)$$

In other words if we define both performance measures in the units applicable to the Treynor index, effected by multiplying the Sharpe index by $\sigma(R_{mt})$, then from 5(iii) we can see that the ranking measures will only give the same results when the funds in question share the

5. K. Smith, D. Tito, "Risk-Return Measures of Ex Post Portfolio Performance", Journal of Financial and Quantitative Analysis, 1969, pp. 449-470.

6. R. Bower, R. Wippen, "Risk-Return Measurement in Portfolio Selection and Performance Appraisal Models", Journal of Financial and Quantitative Analysis, 1969, pp. 417-447.

same correlation coefficient between their respective returns and those of the market. From equation 5(iii) we also note that a correlation coefficient of unity implies an efficient portfolio a result of which is that total and market risk are equated.

Correlation coefficients of less than unity imply as we would expect that market risk is less than total risk. Given this restricted equality between the two measures it is clearly important that their usage is related to the importance investor groups assign to either total or market risk.

Finally we should note that both ratios do allow benchmark comparisons in the sense that the Treynor index can be compared to the excess market return and the Sharpe index compared to the excess market return weighted by the standard deviation of the market.

(c) Jensen Performance Statistic γ ; As we noted in Chapter 4 a key result of CAPM is the linear relationship that exists in equilibrium between risk and return. This relationship is usually summarised in terms of the security market line the slope of which describes the return available for taking on different levels of the only priced element of risk namely market risk. While we would expect in ex ante equilibrium all securities to plot along this line clearly when ex post results are reviewed some securities will plot on the line, some above and some below it. In view of this it would seem reasonable to suggest that the various combinations of risk and return represented by the security market line can be thought of as objective criteria against which overall investment performance can be assessed. The principle difficulty with this approach is of course the point that

ex ante relationships can't be directly observed and indeed must be estimated from ex post data. However it will be recalled from Chapter 4 that the statistically based market model can be utilised to provide ex post estimates of risk return relationships. Working with this ex post result Jensen has suggested the following performance statistic.

$$\gamma = R_i - E(R_i | R_m, \beta_{im}) \quad 5(iv)$$

where;

γ = Performance statistic

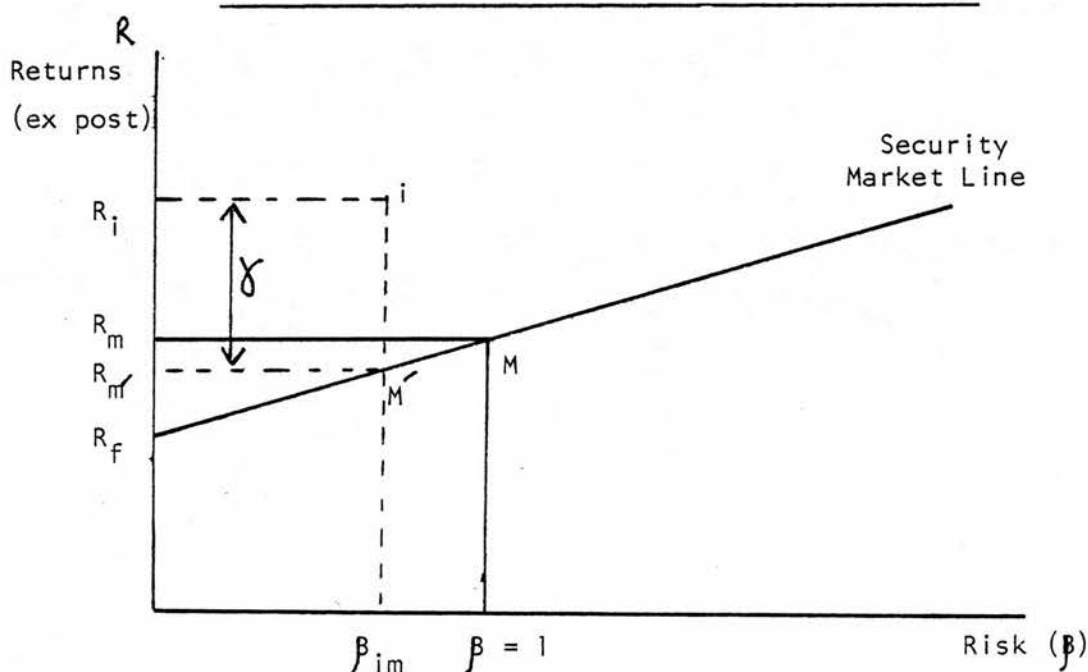
R_i = Achieved return on the i^{th} security

$$E(R_i | R_m, \beta_{im}) = R_f + \beta_{im} [R_m - R_f]$$

We show this result graphically in Graph 5(i).

GRAPH 5(i)

Ex Post Performance Assessment : Jensen γ



From Graph 5(i) it can be seen that the distance δ represents the reported level of return less the level of return that could have been expected given a market level of risk equivalent to β_{im} .

Interestingly an alternative interpretation of the security market line allows it to be considered not just as a standard but as a series of alternative investment strategies,

$$\begin{aligned} \text{i.e. } E(R_i) &= R_f + \beta_{im} [R_m - R_f] \\ &= R_f + \beta_{im} R_m - \beta_{im} R_f \\ &= \beta_{im} R_m + R_f (1 - \beta_{im}) \end{aligned}$$

In other words the expected return on security i is made up of an investment in a portfolio consisting of the risk free asset and the market portfolio. The portfolio weightings attached to these assets are $(1 - \beta_{im})$ and β_{im} respectively. More generally we can note that for each achieved return there is a corresponding benchmark return based on the relevant combination of risk free asset and market portfolio. In the context of assessing ITC performance these alternative or benchmark portfolios have considerable appeal as they represent the results of a series of investment strategies that could have been achieved without active intermediation on the part of managers.

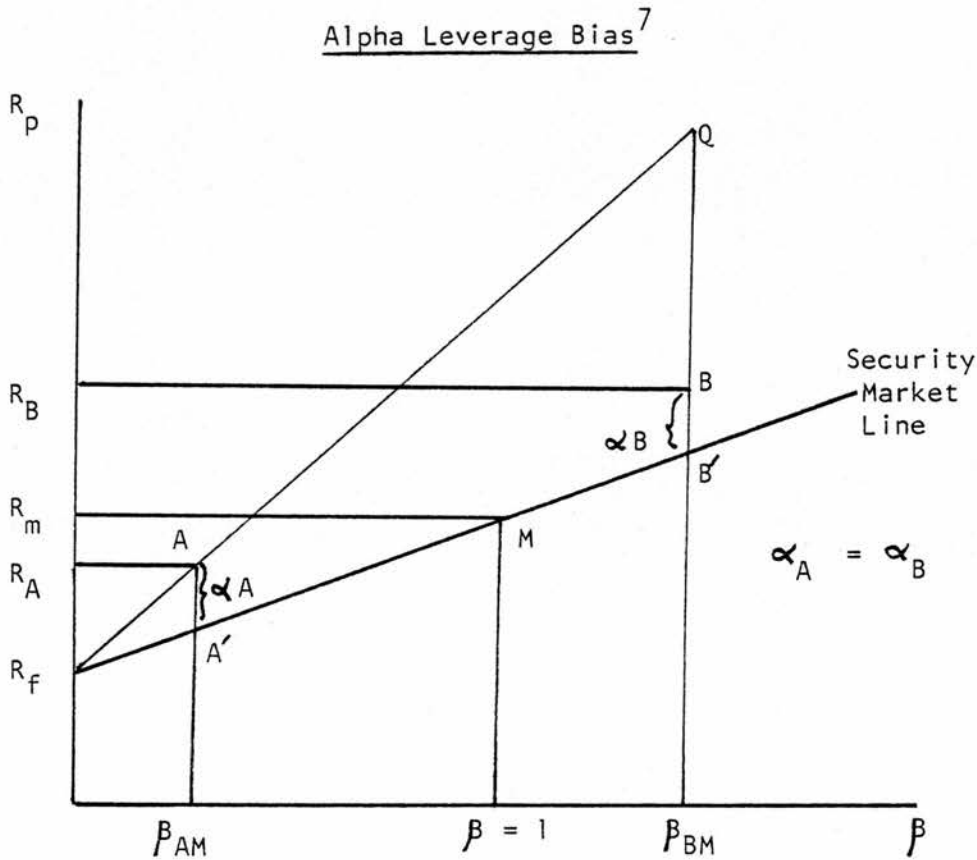
There are several important points that should be noted with regard to the use of the Jensen performance statistic. First of all it can be relatively easily computed. Recall our theoretical estimating equation 4(xi).

$$(\tilde{R}_{it} - R_f) = \hat{\alpha}_i + \hat{\beta}_{im} (\tilde{R}_{mt} - R_f) + \tilde{\epsilon}_{it}$$

In equilibrium the expected value of the intercept term $\hat{\alpha}_i$ is zero but to the extent that it is in practice non-zero then we can interpret its value as the unexpected return (positive or negative) on the i^{th} ITC. Unexpected in the sense that the security's actual return is different from that which we would have expected given the β_{im} risk level. As a useful by-product standard errors and "t" statistics can be fairly easily produced from this regression procedure.

The second point to note with regard to the Jensen statistic is that while it gives a useful measure of unexpected return for individual ITCs it can lead to ambiguous results when used to compare different ITCs. This problem is known as the leverage bias of alpha and its effect is demonstrated in Graph 5(ii).

GRAPH 5(ii)



7. From now on we follow the usual practice of referring to the Jensen statistic as the Jensen alpha (α).

Portfolio A and B report equal levels of alpha but they have been obtained at different levels of risk. Just as the security market line can be thought of as representing alternative investment strategies so too can the higher radical $R_F A Q$. Indeed when α_A is levered up to the same risk level as α_B it is easily seen that it significantly dominates α_B by an amount equivalent in our example to the distance QB. The most obvious way round this problem is to weight estimated alphas by their related levels of market risk. In our example α_A would be weighted by β_{AM} and α_B by β_{BM} . The resulting ratio, very much in the spirit of Treynor's volatility ratio allows unambiguous performance rankings.

Thirdly as with the Treynor and Sharpe indices the relevant risk parameter in the Jensen approach namely beta is assumed to be stationary. Indeed unless it is assumed to be stationary then we really have no way of knowing the appropriate benchmark portfolio against which to assess performance. Jensen recognised this problem and suggested that short run timing operations were consistent with a policy of maintaining a long run or target risk level.⁸ If a manager was successful at timing in the short run then eventually this would be reflected in a positive alpha when related to the long run risk level. Whether or not target or long-run models of risk exposure have any financial relevance is of course an interesting point and one on which there is unfortunately little evidence.

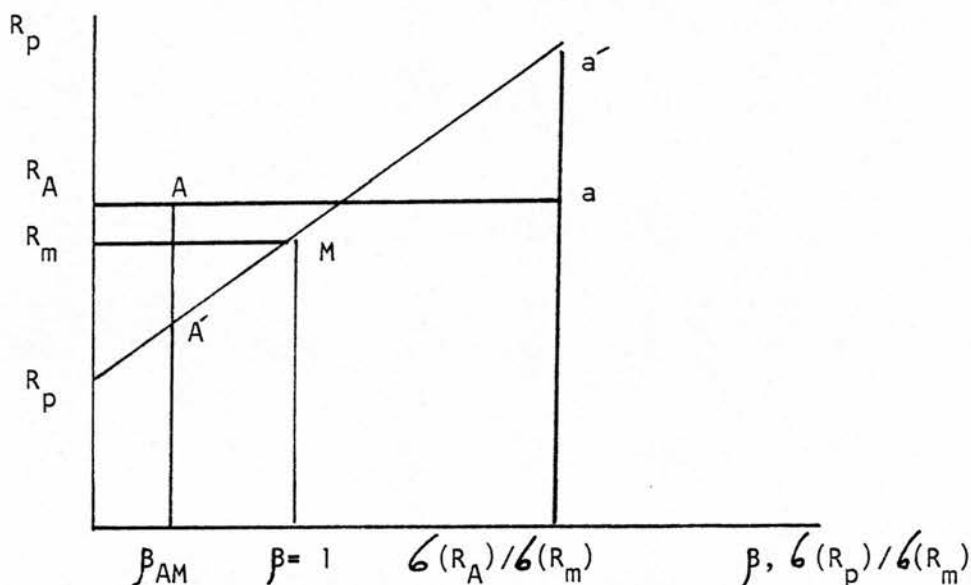
Finally, as the only element of risk that is priced under the conditions of CAPM equilibrium is market risk the Jensen statistic takes no account of varying levels of diversification between different funds. It

8. M. Jensen, "The Performance of Mutual Funds 1945-64", *Journal of Finance*, 23, 1968, pp. 389-417.

solely measures the return to security selection for a given level of market risk and is therefore only relevant to those investors holding well diversified portfolios. To those investors not holding well diversified portfolios management policies of security selection will clearly have a cost in terms of lost diversification. We can obtain some idea of the effects of less than perfect diversification from Graph 5(iii) below.

GRAPH 5(iii)

Security Selection and Diversification
Positive Sloping Ex Post Security Market Line



Measuring both total and market risk in proportionate terms along the x axis we recall from equation 5(i) that the two measures will only equate when we are dealing with an efficient portfolio. For other portfolios $\sigma(R_p)/\sigma(R_m)$ will always plot to the right of the market risk coefficient.

We can interpret the reported performance of portfolio A a poorly

diversified portfolio in the following way. In relation to its market risk the portfolio has clearly outperformed the alternative benchmark portfolio. The achieved alpha is equivalent to the distance AA' . Unfortunately in terms of total risk which takes account both of security selection and diversification the fund underperformed the alternative efficient benchmark portfolio by an amount equivalent to aa' . Thus even although there is considerable evidence of ability to select outperforming securities it is not sufficient to cover the extra risk taken on through lost diversification.

Jensen has provided a more formal framework for assessing the effect of lost diversification.⁹

Recalling;

$$R_i = R_f + \beta_{im}[R_m - R_f]$$

and

$$\beta_{im} = e_{im} \sigma(R_i / \sigma(R_m))$$

then the additional risk taken on through less than perfect diversification will equal;

$$[\beta_{im}/e_{im} - \beta_{im}]$$

Therefore following Jensen it can be shown that incorporating this additional element of risk leads to the following measure of efficiency.

$$Y^* = R_i - [R_f + \beta_{im}[R_m - R_f]] + \beta_{im}[E(R_m) - R_f][1/e_{im} - 1] \quad 5(v)$$

where

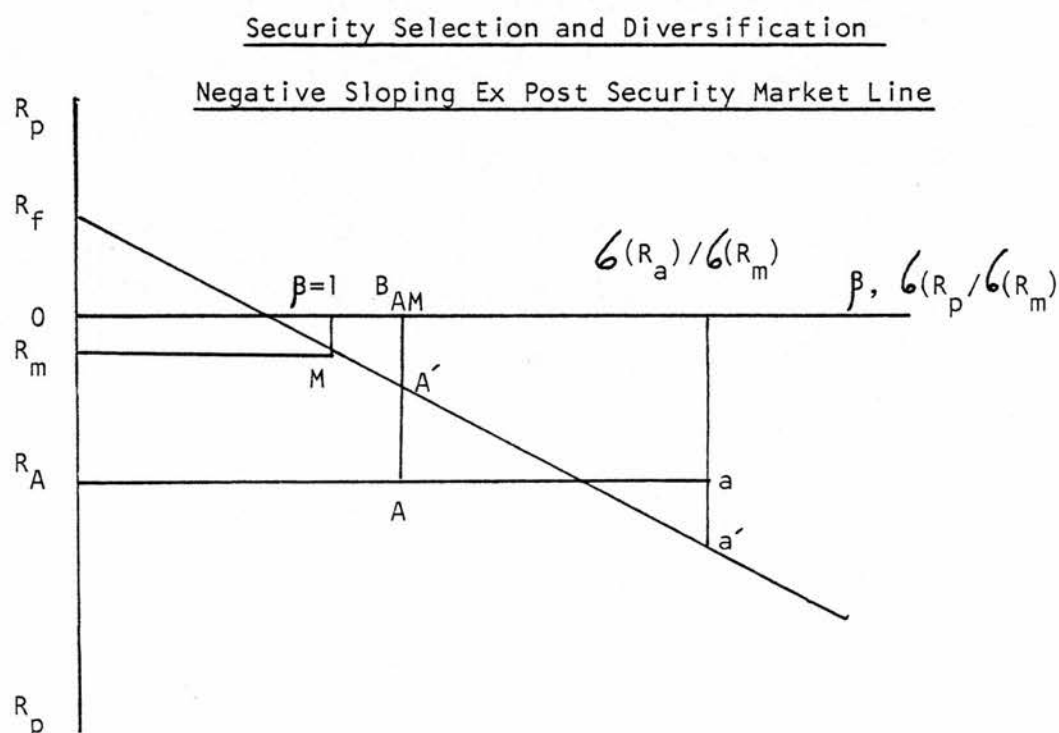
Y^* = measure of efficiency.

9. M. Jensen, "Risk the Pricing of Capital Assets and the Evaluation of Investment Portfolio", Journal of Business, 42, 1969, pp. 116-247.

Note that in this context when we are dealing with efficient portfolios the last term equals zero (i.e. when $\rho_{im} = 1$) the equation reduces to its traditional ex post CAPM form. However when $\rho < 1$ then the last term represents the return premium required to compensate for lost diversification.

We note that Jensen's result cannot be entirely formulated in ex post terms. In fact the crucial efficiency element in equation 5(v) requires knowledge of the ex ante market line. Interestingly the effect of ignoring the implication of this ex ante term can lead to an inconsistent performance conclusion. Following Fama we show in Graph 5(iv) a possible ex post security market line covering an observation period when the market return was less than that available on the risk free asset.¹⁰

GRAPH 5(iv)



10. Bank Administration Institute, "Measuring the Investment Performance of Pension Funds", Illinois 1968, (Authors, E. Fama, et al).

In this situation portfolio A underperformed the market (AA') in terms of market risk but outperformed the market in terms of total risk (aa'). However to say that portfolio A outperformed the market at all is clearly dangerous when there exists a benchmark portfolio (A') with the same beta, a lower level of total risk and a higher return.

Clearly care must be taken in relating the cost of lost diversification to the gains of successful security selection when the ex post security market line is downward sloping. Indeed given the likelihood of a negatively sloping security market line during at least part of the 1970s we do not attempt to split performance in this manner. However we do re-emphasise that such a split is only relevant to those investors who are not able to diversify away the additional unique risk presented to them by ITC managers who follow policies of security selection.

2. Empirical Results : We report various performance results for the 97 ITCs in our data base between 1971 - 1980 based on the Jensen statistic, the Jensen statistic weighted by beta, the Sharpe index of variability and the Treynor index of volatility. We therefore cover both those investors who consider total risk relevant and those who consider market risk relevant. However while we note the values attached to all these statistics we consider that in terms of these alternative investment risk requirements the two most relevant are the Jensen weighted statistic and the Sharpe index.

We also report on both the consistency of performance measures in ranking ITCs and in their predictability between the first and second halves of the decade. Finally following our results in Chapter 4 where we suggested an increasing tendency for policies related to security selection we examine the weighted Jensen statistics derived from the two halves of the decade.

Before presenting our results we describe the estimating procedures adopted.

- (i) Jensen Statistic: We argued in Chapter 3 that a relevant variable in computing returns and risk parameters was the elapsed time between successive trades. Very much in the spirit of this we retain our risk estimating equation as the source of our estimate of the Jensen performance statistic.

$$\text{i.e. } \tilde{R}'_{it}/\sqrt{T} = \hat{\alpha}_i \sqrt{T} + \hat{\beta}_{im} \tilde{R}_{mt}/\sqrt{T} + \tilde{\epsilon}_{it}/\sqrt{T} \quad 5(\text{vi})$$

where;

$$\tilde{R}'_{it}, \tilde{R}_{mt}, T \text{ are as defined for equation 4(xvii).}$$

Given that our model is in terms of estimated daily returns the correct interpretation of the coefficient $\hat{\alpha}_i$ attached to the regression variable \sqrt{T} is that it represents the average unexpected daily continuously compounded return on security i . However in order to present the results in a more useful form we transform them into ten year simple return equivalents expressed in percentage format.

$$\text{i.e. Jensen Statistic} = [[\text{Antilog}[[\hat{\alpha}_i] 365.10]] - 1] 100$$

The weighted Jensen statistic (α_i/β_{im}) was similarly transformed.

It should be noted that our model does not allow the computation of a unique security market line. This rather interesting point arises because of the weightings attached to the market returns. Recall that these weightings are unique in the sense that they take account of the number of elapsed days in each return period. The length of each return period being in turn determined by the dates of the recorded marks for each individual ITC. The result of this weighting is that the estimated excess market return for each ITC will be a function of both the return on the market and the number of elapsed days covered by the return period. We illustrate this by a simple example shown in Exhibit 5(i).

EXHIBIT 5(i)

The Non-Uniqueness of Weighted Market Returns						
Company	Period 1	Period 2	Period 3	Total Period		
				No. of Days ($T_1+T_2+T_3$)	Unweighted Returns ($R_1+R_2+R_3$)	Weighted Returns ($R_1/\sqrt{T_1}+R_2/\sqrt{T_2}$ $+R_3/\sqrt{T_3}$)
<u>Company 1</u>						
Market Return (R)	15%	25%	10%	-	50%	-
Days (T)	30	30	30	90	-	9.12%
<u>Company 2</u>						
Market Return (R)	15%	18%	17%	-	50%	-
Days (T)	20	15	55	90	-	10.33%

Clearly then it would within the context of CAPM be inconsistent given the importance we have attached to trading periods in the computation of returns to utilise some unique or average market return as a performance benchmark. To do so would result in different performance measures and perhaps more importantly in different performance rankings.

This result however does not cause a major problem as individual ITC performance can be assessed against their own individual security market lines."

- (ii) Sharpe Index of Variability : The Sharpe index estimator was defined as follows :

$$S = \frac{1}{\sum}^{118} (\tilde{R}'_{it}) / \hat{\sigma}(\tilde{R}'_{it}/\sqrt{T}) \quad 5(vii)$$

where R_{it} is defined as before and $\hat{\sigma}(\tilde{R}'_{it}/\sqrt{T})$ is the standard deviation estimated over the full period. Note that the standard deviation is calculated on the weighted returns in order that as a risk estimate it excludes variability due to differing trade to trade periods. For presentation purposes the index is transformed into simple return equivalents.

i.e. Sharpe index = $[[\text{Antilog } [S]] - 1] 100$

- (iii) Treynor Index of Volatility : The Treynor index estimator used was estimated as follows

$$T = \frac{1}{\sum}^{118} (\tilde{R}'_{it}) / \hat{\beta}_{im} \quad 5(viii)$$

For presentation purposes;

Treynor index = $[[\text{Antilog } [T]] - 1] 100$

Again the definitions are as before.

Where the various performance measures are presented for sub periods the estimators used were calculated in a similar manner using the data of the particular sub period.

We report estimates of the Jensen statistic, the Jensen weighted

statistic, the Sharpe variability index and the Treynor volatility index for the 118 month period to 12/80 in summary form in Table 5(i) and in more detail in Tables 5(ii) and 5(iii). In presenting these results we also show in Table 5(i) the number of positive performance statistics and comparisons with the appropriate benchmarks. We discussed the Jensen benchmarks above. Those applicable to the Sharpe and Treynor measures were calculated as follows :

	<u>Log</u>	<u>Simple Return Equivalent %</u>
Cumulative (118 month) ordinary returns on the market		
$\sum_{t=1}^{118} R_{mt}$	1.2818	260.342
Less; Cumulative (118 month) return on the risk free asset		
$\sum_{t=1}^{118} R_{ft}$	<1.0538>	186.853
	<hr/>	<hr/>
Excess market return	0.2280	≡ 25.608
	<hr/>	<hr/>

(Note that the average annual return on the risk free asset defined in Chapter 4 as a 3 month Treasury Bill was in simple return form 11.113% p.a.)

The appropriate Treynor benchmark given a market portfolio beta of 1 is clearly the excess market return. The Sharpe measure requires the excess market return to be weighted by the total risk of the market. This was defined as;

	<u>Log</u>	<u>Simple Return Equivalent %</u>
Average estimated standard deviation of the weighted trade to trade market returns taken over the full period. For convenience this was taken as 10 years.		
$\hat{\sigma}(\tilde{R}'_{mt} / \sqrt{T} \sqrt{365.10})$	.8689	138.428

(Note that the justification for using an average standard deviation was discussed in Chapter 4, page 247 and that the need to base this standard deviation on weighted returns was discussed above when we dealt with the estimating procedure for the Sharpe index). -

The appropriate benchmark for the Sharpe index is in log form .2624 (.2280/.8689) which as a simple return is equivalent to 30.00%.

TABLE 5(i)

/ over

TABLE 5(i)

<u>Investment Trust Companies</u> <u>Investment Performance Statistics - Summary</u> <u>118 months to 12/80</u>						
						(%)
Performance Measure	Mean	Minimum	Maximum	Standard Deviation	No. of Positive Statistics	No. of ITCs Market Return
Jensen	-20.52	-55.20	56.09	24.61	12	12
Jenson Weighted	-21.69	-50.69	66.73	25.86	12	12
Sharpe	-3.18	-44.33	62.36	20.67	39	6
Treynor	-2.99	-52.66	79.14	23.24	39	9

TABLE 5(ii) 1/2

Investment Trust Companies									
Investment Performance Measures									
(118 mths to 12/80)									
(%)									
Trust	α	α/β	S	T	Trust	α	α/β	S	T
Aberdeen	2.31	2.55	23.95	26.02	Continental Union	-19.69	-20.67	2.12	2.24
Alliance	-24.82	-25.08	-8.99	-9.89	Drayton Commercial	-30.14	-33.78	-11.14	-12.07
Alliance Trust	-40.01	-44.72	-24.84	-27.81	Drayton Consolidated	-24.55	-27.39	-15.08	-15.95
American	-41.52	-40.27	-28.92	-30.64	Drayton Premier	-29.76	-33.06	-7.05	-7.43
Anglo-American	-39.34	-40.18	-26.96	-27.50	Edinburgh Investment	14.62	15.09	42.20	41.63
Anglo-Scottish	-40.01	-38.59	-22.56	-22.71	Election & General	-55.20	-49.16	-28.39	-32.84
Ashdown	-23.97	-28.94	-16.29	-17.98	English & International	-11.89	-12.60	-0.09	-0.18
Atlantic Assets	0.77	0.56	10.91	13.45	English & New York	-21.29	-23.56	-10.48	-12.30
Atlas Elec & Gen.	-7.74	-7.61	10.61	11.64	English & Scottish	-3.96	-4.21	16.54	16.60
Bankers	-6.76	-7.24	20.27	23.43	Estates Duties	-12.14	-16.54	6.54	7.83
Berry	-7.41	-7.76	6.95	8.65	1st Scottish American	-31.33	-33.77	-17.64	-20.13
Bishopgate	-21.99	-24.93	-7.49	-7.97	Foreign & Colonial	-3.33	-3.31	-13.69	-13.94
Border & Southern	-34.99	-36.94	-24.12	-24.70	General Consol.	-4.62	-4.99	19.68	21.35
British Am & Gen.	-26.93	-29.38	-10.02	-11.14	General Funds	11.52	11.98	38.16	39.65
British Assets	-45.04	-40.36	-28.71	-29.08	General Investors	-7.90	-8.94	11.03	12.43
British Investment	-48.15	-50.69	-42.68	-44.14	General Scottish	-11.14	-13.25	6.80	7.74
Broadstone	-31.33	-30.43	-7.23	-6.80	Glasgos Stockholders	-13.13	-13.86	6.53	6.90
Brunner	7.60	8.05	21.62	22.89	Globe	-11.44	-12.43	9.73	11.18
Capital & National	-13.39	-14.55	2.33	2.54	Great Northern	-23.63	-23.61	-2.59	-2.75
Cardinal	-4.20	-4.52	14.28	15.39	Guardian	-25.37	-24.77	-3.13	-3.34
Cedar	-17.61	-17.89	-3.58	-3.69	Hambros	-21.51	-24.04	-7.45	-8.57
Charter Trust	-21.91	-24.72	-14.57	-16.39	Philip Hill	-13.39	-13.04	18.90	19.92
Claverhouse	14.57	15.31	32.65	33.09	Invest. & General	-8.11	-8.27	17.80	19.45
CLRP	-15.48	-19.19	10.47	12.79	International	-26.80	-24.69	0.28	0.27
Contin. & Indust.	-25.56	-25.40	-10.98	-11.32	Investors Capital	-19.33	-20.911	-12.38	-13.98

Notes :

1. α = Jensen alpha α/β = Jensen alpha-weighted

S = Sharpe variability

T = Treynor volatility

2. All values are shown for presentation purposes only in terms of simple return equivalents.

TABLE 5(ii) 2/2

Trust	α	α/β	S	T	Trust	α	α/β	S	T
Keystone	4.27	4.80	28.76	35.55	Scottish Investment	-40.01	-42.82	-26.15	-34.16
Lakeview	-31.33	-31.23	-18.18	-19.03	Scottish Mortgage	-36.16	-40.95	-28.49	-32.43
London & Holyrood	-13.45	-14.72	7.33	7.43	Scottish National	-10.13	-9.84	7.79	7.74
London & Lomond	-34.51	-34.61	-20.63	-21.94	Scottish Northern	-32.32	-28.07	-17.06	-16.94
London & Montrose	-17.31	-20.27	3.48	3.76	Scottish Ontario	-26.05	-26.97	-5.45	-5.76
London Provincial	-12.66	-14.71	7.91	9.45	Scottish United	-4.02	-5.89	-2.91	-3.74
London Trust	5.73	6.09	30.96	34.57	Second Alliance	-7.71	-7.83	-44.33	-52.66
Mercantile	-41.31	-41.12	-20.92	-22.92	Securities	-18.83	-20.84	-6.20	-6.81
Merchants	-0.08	-0.08	15.74	17.32	Sphere	-20.67	-19.93	-5.58	-5.57
Monks	-26.88	-25.93	-13.75	-13.97	Sterling	-3.75	-4.21	-20.04	-19.76
Murray Caledonian	-45.44	-42.41	-32.05	-31.91	Stockholders	-35.93	-34.23	-21.90	-22.43
Murray Clydesdale	-44.83	-48.48	-30.98	-34.24	Throgmorton	47.77	61.65	62.36	79.14
Murray Northern	-47.58	-46.07	-33.07	-35.14	Trans-Ocean	-24.91	-28.84	-15.82	-16.61
Murray Western	-43.20	-42.96	-33.04	-35.98	Tribune	-13.07	-17.70	-3.65	-4.61
1928	-12.85	-15.91	-5.70	6.36	Trust Union	-11.67	-12.15	2.81	2.75
North Atlantic Secs.	-34.75	-39.74	-29.52	-31.34	Trustees Corp.	-1.77	-1.72	18.25	17.52
Northern American	-30.82	-30.13	-11.65	-13.15	UBS	0.63	0.73	18.77	20.36
Outwich	56.09	66.73	59.19	75.72	US & General	-22.99	-21.90	6.03	5.64
Pentland	-24.05	-22.92	-1.83	-1.78	US Debenture	-23.07	-26.16	-13.89	-14.94
Raeburn	-35.22	-36.41	-18.38	-20.25	W'bottom	-27.36	-30.72	-9.41	-9.71
Romney	-36.16	-35.54	-19.95	-19.91	Witan	-37.78	-38.87	122.51	-24.74
RIT	3.59	5.28	21.87	30.76	Yeoman	-3.65	-3.61	23.47	23.31
St. Andrew	-21.43	-26.42	-12.48	-13.72					
Scottish American	-20.74	-18.77	0.44	0.44					
Scottish Eastern	-36.40	-39.35	-21.35	-23.71					

Notes :

1. α = Jensen alpha
 α/β = Jensen alpha weighted
S = Sharpe variability
T = Treynor volatility

2. All values are shown for presentation purposes only in terms of simple return equivalents.

TABLE 5(iii)

<u>Investment Trust Companies</u> <u>Performance Statistics - Ranking Consistency</u>	
Performance Statistics	Spearman Rho
Jensen with Jensen Weighted	.990
Jensen with Sharpe	.790
Jensen Weighted with Sharpe	.791
Sharpe with Treynor	.996

We note the following points with regard to Tables 5(i), 5(ii) and 5(iii).

1. None of the average performance statistics is positive.
2. Very few ITCs succeeded in achieving returns greater than the appropriate market return.
3. Less than half the ITCs achieved positive risk premiums.
4. The ranking consistency between the various measures is both high and in the direction we would expect.
5. The importance of adopting the appropriate performance measure is highlighted by the lower ranking relationships between the market and total risk determined measures.

These results indicate that the performance levels achieved by ITCs during the 1970s were not particularly impressive. Indeed even attempts to obtain positive risk premiums over the decade were not guaranteed to be successful with only thirty nine ITCs achieving positive risk premiums. From the ITCs that "beat" the market it is interesting to note that slightly fewer achieved it in terms of total risk than market risk. To the poorly diversified investor this result provides little comfort.

In comparing these results to those reported by other authors working with U.K. ITCs we note that Guy found eleven out of forty seven ITCs had negative Jensen, Sharpe and Treynor statistics for the 1960-1970 period with the highest Jensen for each of the two halves of the decade being 0.921% per month (Broadstone) and 0.583% per month (Continental and Industrial).¹¹ The lowest Jensen statistics for each of the two halves of the decade reported by Guy were -.232% per month (Philip Hill) and -.222% per month (Jersey General). For the sector as a whole our results suggest rather poorer performance in the 1970s as compared to the earlier period. Working with 92 ITCs between 1974 and 1979 Corner reports an average Jensen statistic of -.002% per month which when converted to a ten year simple return is approximately -21% a figure slightly greater than our own.¹²

In interpreting the Jensen performance statistics we noted earlier that a useful by-product of the regression procedure is the production of standard errors and "t" statistics. We report these in average form in Table 5(iv).

11. J. Guy, "The Performance of the British Investment Trust Industry", *Journal of Finance*, 33, May 1978, pp. 443-455.

12. D. Corner, J. Matatko, "Investment Trust Portfolio Performance - Measurement and Determinants", *Investment Analyst*, January 1982.

TABLE 5(iv)

<u>Investment Trust Companies</u> <u>Jensen Statistic (α) : Standard Errors</u> <u>"t" statistics</u> (97 ITCs 1/71 - 12/80) (%)				
Statistic	Mean	Minimum	Maximum	Standard Dev.
SE	85.98	57.81	177.87	12.38
t	0.39	-1.15	0.29	0.34

Notes : 1. The standard error of the Jensen statistic (α) is in the same simple return form as the Jensen statistics reported earlier.

The "t" statistics reported in Table 5(iv) indicate that none of the Jensen statistics are statistically significant at the 95% level. This substantially weakens the statistical validity of our reported results. However this very much begs the question of just what level of performance would be required to yield statistically significant results. Following Murphy we note that to be significantly different from zero at the 95% level the reported Jensen statistic would have to be at least two standard deviations from zero. From Table 5(iv) this would imply an achieved alpha in simple return form of 245.89% over the ten year period equivalent to 13.21% per annum. We note that no ITC came anywhere near this level of alpha achievement and indeed to set managers a target return of 13.21% per annum over and above that required for the risk taken on would seem inappropriate. We

are tempted to Murphy's conclusion that, "the statistical techniques in common use are so weak they simply cannot detect good or bad performance in any realistic amounts."¹³

We noted in Chapter 4 some evidence that ITCs were adopting policies that favoured security selection. In spite of the statistical points noted above the Jensen statistic does provide at least a tentative performance measure with which to assess security selection strategies given that it assumes the ITC in question will be considered by investors not as a security on its own but as one holding in a fully diversified portfolio. To investigate whether or not the second half of the decade provides any evidence on the success or otherwise of security selection based strategies Jensen weighted statistics were calculated for both halves of the decade. The results are reported in Table 5(v).

TABLE 5(v)

<u>Investment Trust Companies</u> <u>Security Selection - Jensen Weighted (α/β)</u> (%)		
Characteristics	Period 1 2/71 - 12/75	Period 2 1/76 - 12/80
Mean	-20.13	-1.58
Minimum	-59.95	-41.45
Maximum	53.55	171.41
Standard Deviation	22.99	28.40
No. of Positive Statistics	9	39
No. of ITCs with Positive Statistics in Two Periods	3	

13. J. Murphy, "Why No-One Can Tell Who's Winning", Financial Analysts Journal, June 1980, pp. 49-57.

The differences between the first and second halves of the decade are substantial not only in terms of the average weighted alphas but also in relation to both the number of ITCs reporting positive alphas during the 1976-1980 period and the small number of ITCs with positive alphas in both periods. It would appear that the change in strategy away from the provision of diversified portfolios towards security selection operations was indeed reasonably successful. In one case Atlantic Assets the reported alpha was particularly large at 171.41% although again the result was not statistically significant.

In reviewing ex post performance an aspect that is clearly of interest to investors is the consistency of performance reported by different ITCs. We noted above that only three ITCs had positive Jensen statistics in both halves of the decade. However given the reasonable efficiency of the stock exchange we would not expect to find much evidence of consistently superior or inferior performance. We present evidence of ranking consistency in Table 5(vi).

TABLE 5(vi)

<u>Investment Trust Companies</u> <u>Performance Statistics - Inter-Period Consistency</u> Period 1 : 2/71 - 12/75 to Period 2 : 1/76 - 12/80	
Measurement Statistic	Spearman Rho
Jensen	-.341
Jensen Weighted	-.361
Sharpe	-.341
Treynor	-.320

The Spearman rank correlation coefficients reported above are interesting both because of their negative signs and their relatively large sizes compared to those reported by Guy for the earlier 1960-1970 period. We note that Guy reported rank correlation coefficients of .035, .119 and .022 for the Jensen, Treynor and Sharpe statistics respectively. Our negative signs suggests that consistently superior or inferior performance was not achieved while the absolute size of the coefficients suggest only weak relationships between successive periods.¹⁴ The size difference between the results reported by Guy and our own are more difficult to rationalise although neither suggest an inter-period relationship strong enough to undermine received evidence on the efficiency of the stock market. Without suggesting a detailed explanation a possible source of the difference may lie in the rather more extreme economic conditions characterised by our two periods. For example it could well be that the experiences of the bear market of the first few years of the 1970s acted as a catalyst for the adoption of different investment strategies which proved rather more successful during later years. If this scenario is valid and we have noted above some evidence of both a change in investment strategies and the relative success of this change then this may account for at least some of the reported differences between our results and those of Guy. However we do not go as far as to suggest that the weakness of the absolute size of the Spearman coefficients is conclusive evidence of the sector's unresponsiveness to pressure for change!

We now move on to consider a further aspect of performance assessment namely market timing.

14. J. Guy, "The Performance of the British Investment Trust Industry", *Journal of Finance*, 33, May 1978.

3. Market Timing : We have mentioned the importance of market timing at several stages. In particular when we considered alternative investment strategies and also when we reviewed the inter-period stability of risk coefficients. In addition we have noted the importance attached to the strategy by many investment managers particularly during the twenty to twenty five years following the end of World War II.

By market timing we imply that investment managers attempt either through gearing or security weighting to anticipate future market movements. Thus managers will attempt to hold high beta portfolios in anticipation of bull markets and low beta portfolios in anticipation of bear markets.

Recognition of the point that managers may actively attempt to alter the levels of risk exposure they adopt clearly raises questions as to the adequacy of estimating risk levels under the assumption that they are stationary. Unfortunately as soon as this assumption is dropped then particularly awkward problems arise as to how this new variable risk exposure should be estimated. Some authors have attempted to estimate betas based on models that assume observed betas vary around some fixed long term mean.^{15,16} Others have used econometric techniques such switching and partitioned regression procedures which in general attempt to distinguish between periods of differing beta levels.^{17,18,19} Overall the results are difficult to generalise.

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15. J. Francis, and F. Fabozzi, "Stability of Mutual Fund Systematic Risk Statistics", *Journal of Business Research*, Vol. 8, June 1980, pp. 263-275.
 16. G. Alexander, P. Benson, C. Eger, "Timing Decisions and the Behaviour of Mutual Fund Systematic Risk", *Journal of Financial and Quantitative Analysis*. November 1982, pp. 579-602.
 17. S. Kon, F. Jen, "Estimation of Time-Varying Systematic Risk and Performance for Mutual Fund Portfolios : An application of Switching Regression". *Journal of Finance*, 33, 1978, pp. 457-475.
 18. /

Miller and Gressis for example found strong evidence suggesting the non-stationarity of beta and therefore support for market timing activities while the results of others are less conclusive. A particularly interesting approach was adopted by both Francis and Fabozzi and Alexander and Storer.^{20,21} Both these authors used a dummy variable applied in the former work to the market model and in the latter to CAPM in order to distinguish between bear and bull markets. They then attempted to distinguish differences in beta levels between the two types of market condition. Both papers worked with U.S. mutual fund data Francis and Fabozzi selecting a sample of 85 funds between 1965 and 1971 while Alexander and Stover used 49 funds between 1966 and 1971. We note their conclusions below :

- i. Francis and Fabozzi, "... mutual fund managers did not shift their fund's beta to take advantage of market movements"
- ii. Alexander and Stover, "... mutual funds were unable to significantly increase their beta when market conditions changed from bearish to bullish, whether coincidentally leading or lagging the change in market conditions".

While it is not our purpose to build a sophisticated model to assess performance under conditions of non-stationary risk coefficients we are interested in more general approaches to the assessment of market

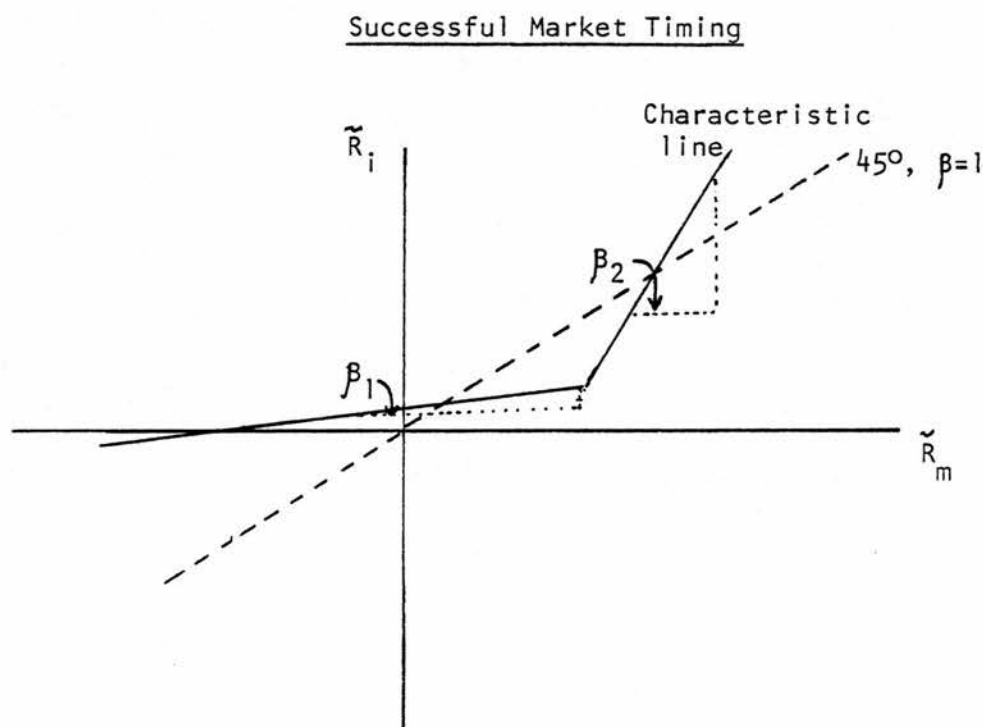
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- 18. S. Kon, F. Jen, "The Investment Performance of Mutual Funds : An Empirical Investigation of Timing, Selectivity and Market Efficiency" *Journal of Business*, 52, April, 1979, pp. 263-289.
 - 19. T. Miller, N. Gressis, "Non-Stationarity and the Evaluation of Mutual Fund Performance", *Journal of Financial and Quantitative Analysis*, 15, September 1980, pp. 639-654.
 - 20. J. Francis and F. Fabozzi, "Mutual Fund Systematic Risk for Bull and Bear Markets : An Empirical Investigation", *Journal of Finance*, 34, December 1979, pp. 1243 - 1250.
 - 21. G. Alexander, R. Storer, "Consistency of Mutual Fund Performance During Varying Market Conditions", *Journal of Economics and Business*, 32, Spring 1980, pp. 219-226.

timing strategies. Two such approaches are available the first following the work of Treynor and Mazuy and the second the work of Main.^{22,23} We deal with each in turn.

Treynor and Mazuy noted that if a manager is consistently successful in matching risk levels to market conditions then we would expect to observe a characteristic line that reflects a strong relationship between the two return variables during different market conditions.

For example if we assume only two market states corresponding to bull and bear conditions the characteristic line of the successful market timer would be similar to that shown in Graph 5(v) below.

GRAPH 5(v)



22. J. Treynor, K. Mazuy, "Can Mutual Funds Outguess the Market", Harvard Business Review, 44, 1966, pp. 131-136.

23. N. Main, "Risk, The Pricing of Capital Assets and the Evaluation of Investment Portfolios : Comment. Journal of Business. July 1977.

During bear markets our hypothetical manager has successfully adopted B_1 which is less than the unitary market beta while in bull markets he is equally successful in that his portfolio has a beta level greater than unity at B_2 . A less extreme and perhaps more realistic relationship between the market and fund returns for the successful market timer would be that of a positively sloping curve. Thus a test of market timing would be to determine whether the addition of a quadratic term to the equation of the characteristic line results in both a positive and statistically significant slope coefficient. Adopting this technique we note that Treynor and Mazuy reported only one mutual fund out of 59 that evidenced any superior ability at market timing.

In order to assess the market timing achievements of ITCs we ran the following regression for each of the 97 ITCs over the full 118 month period.

$$\tilde{R}'_{it}/\sqrt{T} = \hat{\alpha}_i\sqrt{T} + \hat{\beta}_{im}\tilde{R}'_{mt}/\sqrt{T} + \hat{Q}_{im}(\tilde{R}'_{mt}/\sqrt{T})^2 + \tilde{E}_{it}/\sqrt{T} \quad 5(ix)$$

where;

$$\tilde{R}'_{it}, \tilde{R}'_{mt} = \text{As before (see equation 4(xvii))}$$

$$\hat{\alpha}_i, \hat{\beta}_{im}, \hat{Q}_{im} = \text{Regression coefficients.}$$

The results are summarised in Table 5(vii).

It would appear from Table 5(vii) that a substantial number of ITC slope coefficients are negative although only 3 are significantly so. However some 13 have "t" statistic values greater than 1.²⁴ The identification of a negative slope coefficient suggests that some ITCs

24. As a rough rule of thumb an absolute "t" statistic of greater than 1 will result in a higher coefficient of determination for the equation. See D. Aigner, "Basic Econometrics" (Prentice Hall), 1971, pp 91-92.

TABLE 5(vii)

<u>Investment Trust Companies</u> <u>Sign and Significance of the</u> <u>Regression Coefficient \hat{Q}_{im}</u>	
Description	Number
A) <u>Positive</u> \hat{Q}_{im}	
Number	60
Statistically Significant ("t" test at 95%)	7
"t" values > 1	32
B) <u>Negative</u> \hat{Q}_{im}	
Number	37
Statistically Significant ("t" test at 95%)	3
"t" values > 1	13

managed to hold high beta portfolios in bear markets and low beta portfolios in bull markets! On the other hand 60 ITCs had positive slope coefficients although again only a relatively small number were statistically significant. To gain some idea of the effect on the fit of the data when the quadratic term is added we compare the R^2 s reported from equation 4(xvii) in Chapter 4 with the R^2 s from equation 5(ix) for those ITCs with statistically significant slope

coefficients. The results are shown in Table 5(viii).

TABLE 5(viii)

Investment Trust Companies			
<u>R^2_s Compared</u>			
Trust	R^2 Equation 4(xvii)	R^2 Equation 5(xi)	Jensen Stat. Equation 4(xvii)
A. <u>Positive</u> \hat{Q}_{im}			
Alliance Trust	.59	.62	-ve
Atlas Electric & Gen.	.64	.67	-ve
Estates Duties	.54	.59	-ve
Globe	.60	.62	-ve
St. Andrew	.61	.63	-ve
Scottish Ontario	.70	.72	-ve
US and General	.71	.72	-ve
B. <u>Negative</u> \hat{Q}_{im}			
Brunner	.67	.71	+ve
General Scottish	.59	.61	-ve
London & Holyrood	.67	.70	-ve

Clearly the addition of the quadratic term has only a very marginal effect on the overall goodness of fit. Indeed we note that the average R^2 across the full data base only increased from .64 to .65. Similarly the overall effect on reported performance is not sufficient to

suggest a noticeable performance relationship between market timing and the Jensen statistics.²⁵ However in order to substantiate this latter point our second approach to the assessment of market timing specifically tests for such a relationship by noting the results of the following regression.

$$\alpha_{i2} = A_i + B_i \beta [\hat{\beta}_{i1} - \hat{\beta}_{i2}] \quad 5(x)$$

where;

α_{i2} = Jensen performance statistic for the period 1/76 to 12/80 for the i^{th} ITC as estimated by equation 5(ix)

β_{i1} = Market risk coefficient for period 2/71 to 12/75 on the i^{th} ITC as estimated by equation 4(xvii)

β_{i2} = Market risk coefficient for period 1/76 to 12/80 on the i^{th} ITC as estimated by equation 4(xvii)

The results of running this regression relating changing market risk levels to achieved performance are as follows :

$$\alpha_{i2} = -.02 + .17 [\hat{\beta}_{i1} - \hat{\beta}_{i2}]$$

$$R^2 = .02$$

"t" (-.91) (1.47)

SE (.02) (.11)

The relationship is clearly weak and confirms the suggestion noted above that little connection exists between reported performance and

25. We note that the Brunner results suggest that poor timing was more than compensated for by successful security selection strategies!

and management's attempts to time the market through varying market risk levels. The alternative conclusion that it is evidence of risk stationarity we would reject given our reported results on inter period beta rankings. We note in passing that Main reported a significantly negative beta change coefficient when working with Jensen's original data indicating that those mutual funds that had higher period 2 risk levels achieved higher levels of risk adjusted performance.²⁶

We have now completed our presentation on the achieved performance of ITCs during the decade and move on to a critique of the results and methodology.

4. Investment Performance - A Critique : We detail our critique of investment performance in the following three sub-sections.

- (i) The Results - A Résumé.
 - (ii) The Methodology and its Empirical Validation.
 - (iii) An Alternative Methodology.
- (i) The Results - A Résumé : Working with a CAPM methodology we have presented empirical results covering
- the relationship of risk exposure to management objectives
 - the consistency of risk measures
 - the levels of achieved diversification
 - the success of security selection policies
- and the success of market timing policies.

We reported a weak relationship between risk exposure and management

26. N. Main, "Risk the Pricing of Capital Assets and the Evaluation of Investment Portfolios : A Comment", Journal of Business, July 1977.

objectives and noted that there was little inter-period consistency between risk levels and what there was indicated that total risk levels were more consistent than market risk levels. ITCs achieved reasonable levels of diversification throughout the decade although we identified a tendency for these to be smaller over the second half of the decade. We suggested a possible interpretation in terms of a tendency towards policies involving security selection. In this context we noted that in practice such a policy change would be consistent with the policy options available to ITC managers during the later years of the 1970s.

In terms of risk-adjusted performance achieved we reported first of all on the necessity to relate performance measures to investor requirements. Secondly we noted little evidence that over the decade as a whole active management had resulted in superior performance although during the second half of the decade a substantially larger number of ITCs reported positive performance as measured by the Jensen weighted statistic. This we suggested was further evidence that policy changes towards adopting security selection strategies had been adopted and were proving reasonably successful. To the extent that ITCs were noted as moving away from policies related to the provision of well diversified return flows towards security selection policies then they would become relatively less attractive to those investors not holding well diversified portfolios. Indeed it may well be that such investors should now consider holding small portfolios of ITC equities in order

to achieve their desired levels of diversification. We also noted that very much in the spirit of the received evidence on efficient markets there did not appear to be a consistent inter-period relationship between achieved performance levels. What relationship there was we noted as being weak and negative.

Finally given the practical importance of market timing as perceived by many ITC managers we examined whether any evidence of successful timing strategies could be identified. Unfortunately we noted no such evidence.

- (ii) The Methodology and its Empirical Validation : To a very large extent our empirical results are based on the underlying usefulness of the CAPM methodology. Clearly if this methodology is theoretically suspect or is not consistent with empirical evidence our results are weakened. We look first at the empirical validation of the model and then at its theoretical foundations.

The empirical support for CAPM rests almost entirely on the results of several large U.S. studies which test the basic CAPM conclusion;

$$E(R_i) = R_f + \beta_{im} [E(R_m) - R_f] \quad 5(xi)$$

In general the tests have attempted to show that if CAPM accurately models the pricing mechanism for risky assets then;

1. On average and over relatively long periods of time there should be a positive linear relationship between systematic risk and return.

2. The intercept and slope of the relationship between systematic risk and return should for the period under consideration equal the average risk free return and the average market risk premium respectively.
3. Unique or non-market risk should play no significant role in explaining differences in the returns on risky assets.^{27,28,29,30,31,32.}

The results of these various tests have been usefully summarised by Myers and Pogue.³³

- "1. The evidence shows a significant positive relationship between realized returns and systematic risk. However the slope of the relationship is usually less than that provided by CAPM.
2. The relationship between risk and return appears to be linear. The studies give no evidence of significant curvature in the risk-return relationship.
3. Tests that attempt to discriminate between the effects of systematic and unsystematic risk do not yield definitive results. Both kinds appear to be positively related to security returns. However there is substantial support for the proposition that the relationship between return and unsystematic risk is at least partly spurious - that is it partly reflects statistical problems rather than the true nature of capital markets."

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27. N. Jacob, "The Measurement of Systematic Risk for Securities and Portfolios : Some Empirical Results", *Journal of Financial and Quantitative Analysis*, 1971, pp. 815-834.
 28. M. Miller, M. Scholes, "Rates of Return in Relation to Risk : A Reexamination of Recent Findings" in M. Jensen "Studies in the Theory of Capital Markets", (New York) Praeger, 1972, pp. 42-78.
 29. M. Blume, I. Friend, "A New Look at the Capital Asset Pricing Model", *Journal of Finance*, March, 1973, pp. 19-33.
 30. F. Black, M. Jensen, M. Scholes, "The Capital Asset Pricing Model : Some Empirical Tests" in M. Jensen, "Studies in the Theory of Capital Markets" (New York), Praeger, 1972, pp. 79-121.
 31. E. Fama, J. MacBeth, "Risk, Return and Equilibrium : Empirical Tests", *Journal of Political Economy*, June 1973, pp. 607-638.
 32. W. Sharpe, G. Cooper, "Risk Return Classes on the New York Stock Exchange" *Financial Analysts Journal*, April 1972, pp. 46-54.
 33. S. C. Myers, G. Pogue, "Tests of the Capital Asset Pricing Model" in F. Modigliani, G. Pogue, "An Introduction to Risk and Return", *Financial Analysts Journal*, June 1974, pp. 69-86.

In the U.K. context very little work has been done on testing the model partly because until recently extensive and accurate data bases were not available and partly because of theoretical problems associated with the market portfolio. However Guy working with sample data from 99 U.K. companies for the period 1960-1970 and adopting a methodology similar to that of Fama and MacBeth found only a weak positive linear relationship between beta and return.³⁴

We note that much of the empirical evidence relates to periods earlier than the one we are primarily concerned with and while this would be unimportant if CAPM represented the "true" risk return relationship a considerable body of evidence has been accumulating in more recent years that would seriously question the Myers-Pogue conclusions and in particular their third conclusion.³⁵

In Chapter 3 we reviewed several studies and presented some results all identifying additional elements in the correlation matrix of returns. Further evidence would include results reported by Litzenberger and Ramaswamy and Basu.^{36,37} More recently work by both Banz and Reinganum has suggested that market capitalisation may well have an important role to play in the pricing of assets.^{38,39}

34. J. Guy, "The Stock Exchange, London : An Empirical Analysis of Monthly Data from 1960-1970", Paper presented to the European Finance Association, 1975, pp. 9-54.

35. An interesting summary of the various extensions etc that have been developed from the basic CAPM together with some indication of their validity is given in;
S. Ross, "The Current Status of the Capital Asset Pricing Model", Journal of Finance, 33, June 1978, pp. 885-901.

36. R. Litzenberger, K. Ramaswamy, "The Effect of Personal Taxes and Dividends on Capital Asset Prices", Journal of Financial Economics, June 1979, pp. 163-195.

37. S. Basu, "Investment Performance of Common Stocks in Relation to their Price : Earnings Ratios : A Test of Market Efficiency", Journal of Finance, 32, June 1977, pp. 663-682.

38. R. Banz, "The Relationship between Return and the Market Value of Common Stocks", Journal of Financial Economics, March, 1981, pp. 3-18.

The latter author also noted that price : earnings ratios and abnormal performance were significantly related although when returns were controlled for the size effect this relationship virtually disappeared. We deal with these two articles in more detail in Section 5 where we present results based on the relationship between ITC size and performance.

Finally we note two points in connection with the adequacy of using the FTA-AS index as the relevant source for market returns. First of all as it represents the returns from an investment strategy that incurs no management or transaction expenses it is arguable that we have set an unrealistically high benchmark standard. Consideration was given to adding back management and trading expenses to the ITC returns. We rejected such an approach partly because of the difficulty noted in Chapter 1 of identifying ITC trading expenses and partly because one of the attractions of assessing net returns against gross returns is that it does lead to performance rankings that specifically account for the intermediation expenses involved.

Secondly ITCs have traditionally invested internationally and indeed we reported in Chapter 1 that the sector usually maintains approximately 30% of its assets overseas. It could be argued that an internationally based series of market returns would more adequately reflect the security population available to ITCs. We justify the use of the FTA-AS index partly because of its wide appeal in practice as a benchmark against which to assess the performance of U.K. managed funds and partly because the available international indices (e.g. Capital International's World Index) while obtaining international spread do so at the expense of losing some domestic coverage. Consideration of the appropriate surrogate for the return on the market portfolio leads on to perhaps the most substantive criticisms of the CAPM methodology. These criticisms have been formulated and delivered in a series of papers by Roll.^{40, 41, 42, 43.}

39. M. Reinganum, "Misspecification of Capital Asset Pricing : Empirical /

Roll's analysis of CAPM centres on the ex ante mean-variance efficient market portfolio which as we noted in Chapter 4 is the only relevant portfolio in equilibrium. He suggests that empirical tests of CAPM that concentrate on validating the linear positive risk return result shown in equation 5(xi) cannot be considered successful in the sense that they fail to test for the ex ante efficiency of the market portfolio. Myers and Rice usefully summarise the Roll conclusions on testing CAPM as follows ;

- "(a) The only testable implication of the model is that the true market portfolio is mean-variance efficient.
- (b) The return on the true market portfolio is not used in any of the empirical tests to data and is virtually impossible to measure. The theory is not testable unless the exact value-weighted market portfolio of all assets is used.
- (c) All tests of the model involve joint hypotheses, one of which is that the market portfolio is correctly measured. Since we know that the market portfolio is not correctly measured, the rejection of the joint hypothesis tells us very little."⁴⁴

Roll's arguments have been met with varying degrees of acceptance and the controversy is by no means over. Those who support his position and therefore reject much of the CAPM paradigm as untestable are countered by those who suggest he takes too nihilistic a view of financial theories. In particular the difficulty of

/Anomalies based on Earnings Yields and Market Values", Journal of Financial Economics, March 1981, pp. 19-46.

- 40. R. Roll, "A Critique of the Asset Pricing Theory's Tests. Part 1 : On Past and Potential Testability of the Theory", Journal of Financial Economics, 4, 1977, pp. 129-176.
- 41. R. Roll, "Ambiguity when Performance is Measured by the Securities Market Line", Journal of Finance, 33, 1978, pp. 1051-1069.
- 42. R. Roll, "Performance Evaluation and Benchmark Errors, Part 1", Journal of Portfolio Management, Summer, 1980, pp. 5-12.
- 43. R. Roll, "Performance Evaluation and Benchmark Errors, Part 2", Journal of Portfolio Management, Winter, 1981.
- 44. D. Myers, E. Rice, "Measuring Portfolio Performance and the Empirical Content of Asset Pricing Models", Journal of Financial Economics, 7, 1979, pp.3-28.

testing a theoretical ex ante hypothesis with ex post surrogates is one that is present in most economic models. To conclude that the model and its implications should be rejected on these grounds alone is too severe. There is an intuitive appeal about the risk return relationship described by CAPM that is widely accepted in spite of Roll's criticism as to its testability. Indeed more generally lack of testability or even some evidence refuting a theoretical conclusion are not necessarily sufficient conditions for rejecting the conclusion or ignoring the insights a particular model provides. In this context we note the comment by Stigler quoted in the Myers and Rice article.

"The answer is that it takes a theory to beat a theory. If there is a theory that is right 51% of the time it will be used until a better one comes along."⁴⁵

In addition to examining the testability of CAPM Roll has also explored the implications for performance assessment that result from an inability to observe or accurately observe the ex ante market portfolio. As we noted above the measurement of investment performance involves assessing ex post performance against the level of performance that could have been expected. In terms of CAPM expected performance is described by the ex ante security market line. The relationship between return and risk described by the ex ante security market line is of course strictly unobservable and as we have done is usually estimated from ex post data. Roll now presents a difficulty. If the security market line we actually estimate is the "true" ex ante security market line then all securities will plot more or less along the line and we will not be able to observe either significantly inferior or superior

45. G. Stigler, "Theory of Price", Macmillan, 1964 (New York).

performance. On the other hand if the market portfolio surrogate we use to determine the ex post security market line is not ex ante efficient then its use can hardly be justified on the grounds that it represents the "true" risk return relationships in the economy. Roll describes the differences between the ex ante security market line and the use of an ex post surrogate that is not ex ante efficient as "benchmark errors" and he investigates their effects in some depth. In particular he shows how the use of different ex post surrogates can result in different benchmark errors. Indeed in a particularly revealing example he shows the conditions that will lead to positive benchmark errors on one series of market returns and negative errors on another when both are used to assess the same portfolio. He concludes that the possibility of such ambiguity existing reduces considerably if not completely the validity of CAPM based performance measures. Again we suggest this is too severe a criticism. The same reasons are relevant. We must always use proxies as ex ante values are unobservable. What Roll's criticisms do serve to remind us of is that great care must be taken in both deciding the ex post surrogate to use for assessment purposes and in fully appreciating the effects on assessment that changes in the surrogate imply. We suggest that this is a useful reminder of what most ITC managers would be only too well aware of!

We note in passing that Myers and Rice have attempted to formulate CAPM in a manner that will allow superior performance to be identified.^{46,47} They do this by effectively weakening the key

46. D. Myers, E. Rice, "Measuring Portfolio Performance and the Empirical Content of Asset Pricing Models", *Journal of Financial Economics*, 7, 1979, pp. 3-28.

47. R. Verrechia, "The Myers-Rice Conjecture - A Counter Example", *Journal of Financial Economics*, 8, 1980, pp. 87-100.

equilibrating CAPM assumption of homogeneous expectations amongst all investors. They suggest that information asymmetries between market participants can be characterised by two categories of investor - the informed and the uninformed. From this basis they derive the CAPM conclusions with identifiable and superior performance for the informed investor group. Unfortunately in order to ensure that market wide risk return expectations are formed by the dominant uninformed investor group they require strong assumptions preventing the informed and successful group from eventually dominating the market. As Cornell notes there are many "... unsolved conceptual problems with introducing asymmetric information into the CAPM!"⁴⁸

- (iii) An Alternative Methodology : If one accepts the Roll criticisms described above there is a clear necessity to provide an alternative equilibrium theory of asset pricing or at least in the context of performance assessment a methodology that avoids the performance assessment ambiguities identified by Roll. On this latter point Cornell has suggested, with Roll's apparent agreement that an adequate method of assessing performance would involve observing the investment weights of a given portfolio, estimating the mean return on all individual securities within the portfolio and then computing the portfolio's expected return over an initial period. The actual return in a subsequent period would then be recorded and the unexpected return calculated. We question whether such a complete rejection of the pricing implications of risk is justified.^{49,50}

48. B. Cornell, "Asymmetric Information and Portfolio Performance Measurement", *Journal of Financial Economics*, 7, 1979, pp. 381-390.

49. B. Cornell, "Asymmetric Information and Portfolio Performance Measurement", *Journal of Financial Economics*, 7, 1979, pp. 381-390.

50. S. Hemmerick, "Return to Simpler Methods : Roll" *Pensions and Invest-*
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An interesting alternative approach to performance assessment has been explored by Saunders, Ward and Woodward.⁵¹ They argue that assessing performance on the basis of only the first and second moments of return distributions ignores the possibility that consideration of higher distributional moments may well reveal superior performance. Stochastic dominance techniques allow these higher moments to be examined. In applying this procedure to the monthly returns of 30 unit trusts and the FT '650' index between February 1975 and November 1977 they concluded that ;

" ... trusts as a group have generally outperformed the market. ... when mean variance efficiency frontiers were calculated for the same time period no superior performance resulted for trusts as a group."

While the mean-variance framework has a definite "finance appeal" in terms of risk and return it is not entirely clear what the financial relevance of higher distributional moments is.

Perhaps the most interesting theoretical development in the area of asset pricing has been the formulation of the Arbitrage Pricing Theory (APT).^{52,53} The proponents of this theory suggest that it avoids both the distributional assumptions of CAPM and the problems we discussed above in relation to the central role CAPM ascribes to the market portfolio.

The derivation of APT follows from an assumption that the return

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- / Investments, August 18, 1980. (This article was a reported interview between Hammerick and Roll.)
51. A. Saunders, C. Ward, R. Woodward, "Stochastic Dominance and the Performance of U.K. Unit Trusts", *Journal of Financial and Quantitative Analysis*, June 1980, pp. 323-330.
 52. S. Ross, "Returns, Risk and Arbitrage" in *Risk and Return in Finance*, (Ed. I. Friend, J. Bicksler), Massachusetts, 1972, pp. 189-218.
 53. S. Ross, "The Arbitrage Theory of Capital Asset Pricing", *Journal of Economic Theory*, 13, 1976, pp. 341-360.

generating process for risky assets can be described as ;

$$\tilde{R}_i = E(\tilde{R}_i) + \beta_{i1}\tilde{F}_1 + \beta_{i2}\tilde{F}_2 + \dots + \beta_{iK}\tilde{F}_K + \tilde{\epsilon}_i \quad 5(xii)$$

where;

\tilde{F}_1 to \tilde{F}_K = Underlying and independent elements of return
common to all risky assets.

$\tilde{\epsilon}_i$ = An element of return unique to the i^{th} risky
asset

$$E(\tilde{F}_1 \text{ to } \tilde{F}_K) = 0$$

$$E(\tilde{\epsilon}_i) = 0$$

By considering equation 5(xii) at the portfolio level we can effectively ignore the unique return terms which we assume are diversified away.

We can imply from equation 5(xii) that the return from a portfolio of risky assets will be a linear combination of the return on the risk free asset and the returns on the K factors. Alternatively we can consider the returns on the risk free asset and the K factors as linear combinations of the returns on K + 1 portfolios of risky assets. As the returns on all portfolios of risky assets are linear combinations of the returns on the risk free asset and the returns on the common factors we can use our K + 1 portfolios to build portfolios that will be perfect substitutes for any other portfolio. We would expect perfect substitutes to command equal returns in the market. If this were not the case then arbitrage profits would be possible by going long in the portfolio with the higher return and short in the portfolio with the lower return. In the world of APT an individual investor holding a well diversified portfolio is considered to be in equilibrium when it is not possible for him

to construct an alternative portfolio to.... leave him better off without involving either additional risks or requiring additional funds. In other words the market is efficient enough to ensure that perfect substitutes are equally priced and thus when the market is in this efficient equilibrium prices are established based on the linear combination of the returns from the risk free asset and the various factors.

Two points are clearly of critical relevance to the applicability of APT. The first concerns the number of common factors and the second their identification with financial variables. In Chapter 3 we noted that Roll and Ross had reported the presence of at least five priced factors in their study of U.S. returns while our own results also in Chapter 3 strongly suggested the presence of at least two common effects in the correlation matrix of ITC returns.⁵⁴ The usefulness of APT turns on their being considerably fewer common factors than risky assets and this certainly appears to be the case. The second point again noted in Chapter 3 is that it is extremely difficult to establish a consistent relationship between ex post explanatory "factors" and theoretically valid financial variables.^{55,56} The danger is that the model slips from being a theoretical model of equilibrium pricing into an ex post explanatory methodology.

In comparing APT to CAPM it is certainly true that APT does not require a mean-variance framework nor does it ascribe a central role

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- 54. R. Roll, S. Ross, "An Empirical Investigation of Arbitrage Pricing Theory", *Journal of Finance*, 35, December 1980, pp. 1073-1103.
 - 55. J. Shankin, "The Arbitrage Theory - is it Testable?" *Journal of Finance*, December 1982.
 - 56. M. Reingamun, "Arbitrage Pricing Theory - Some Empirical Results", *Journal of Finance*, December 1981.

to the market portfolio. However this increased generality carries with it a cost in terms of lost financial relevance. This cost will remain until the various communalities underlying the returns of risky assets have been more positively identified.

5. The Relationship between Size and Performance : While we suggest that much work still remains to be done in firmly establishing APT as a useful equilibrium pricing theory the general approach has been applied in the context of performance assessment. We provide an example of its application to an aspect of performance that has particular relevance to ITCs given the marketability comments often made with regard to the sector.

The argument underlying the potential importance of the relationship between size and performance runs as follows. The ITC sector is often considered as extremely homogeneous with this lack of differentiation being expressed in terms of the "poor marketability" of certain ITCs. If different ITCs do have differing levels of marketability then we would expect that in equilibrium those investors holding the less liquid or less marketable ITC equities would be compensated in terms of higher expected returns. In other words comparisons of ITC performance that ignored the liquidity perspective would run the risk of overstating the achieved performance of the less liquid ITCs.

The problem in attempting to identify a relationship between performance and liquidity is to reach a definition of liquidity that is empirically meaningful. One such definition assumes that market capitalisation could well act as a surrogate for marketability. Indeed we suggest that it is reasonable to assume that larger ITCs can in fact be considered

more marketable than smaller ITCs. Such differences in marketability may arise for several reasons including the greater likelihood of informational asymmetries of the type discussed in Chapter 1 existing in the market for small ITCs perhaps because they have proportionally less floating equity as a result of director holdings or even because of cross holdings with other ITCs under the same management group. However we recognise that allowing market capitalisation to act as a surrogate for marketability is in fact an important assumption and one that is as yet intuitive rather than proven.

We first of all review the two major studies in this area and then present some results for the U.K. ITC sector.

(i) Reported Results on the Relationship Between Size and Performance :

Banz has reported evidence on the importance of a size related variable underlying asset pricing. His work is divided into two sections and is based on monthly returns between 1926 and 1975 for the full CRSP database.⁵⁷ The first section tests the model;

$$E(R_i) = \gamma_0 + \gamma_1 \beta_i + \gamma_2 [Q_i]$$

where;

$E(R_i)$ = expected return of security i

γ_0 = expected return on the zero-beta security

γ_1 = expected market risk premium

γ_2 = constant measuring the contribution of Q_i to the expected return of security i

Q_i = the market value factor of security i

57. R. Banz, "The Relationship between Return and Market Value of Common Stocks", *Journal of Financial Economics*, 9 March 1981, pp. 3-18.

Banz used the portfolio-beta estimating procedures of Black and Scholes, performed the monthly cross-sectional regressions based on the above model and then very much in the spirit of Black and Scholes used the $\hat{\alpha}_2$ from the following time series regression as the γ_2 estimator;^{58,59}

$$\hat{\gamma}_{2t} - R_{ft} = \hat{\alpha}_2 + \hat{\beta}_2 (R_{mt} - R_{ft}) + \hat{\epsilon}_{2t}$$

We summarise Banz's results in Table 5(ix).

TABLE 5(ix)

Size Premiums as Reported by Banz		
Total and Sub-Periods		
CRSP Database 1936-1975		
Period	$\hat{\alpha}_2$	$t(\hat{\alpha}_2)$
1. <u>Total Period</u> :		
1936 - 1975	-.00052	-2.92
2. <u>Sub-Periods</u> :		
1936 - 1955	-.00043	-2.12
1956 - 1975	-.00062	-2.09
3. <u>Sub-Periods</u> :		
1936 - 1945	-.00075	-2.32
1946 - 1955	-.00015	-0.62
1956 - 1965	-.00039	1.27
1966 - 1975	-.00080	1.55

Over the total period the negative size sign strongly suggests that the larger the company the smaller returns and vice-versa for smaller companies. Interestingly the relationship is less significant and highly variable over the shorter sub-periods.

Banz's second approach to examining the size performance relationship is in essence based upon an arbitrage methodology. Working with the same data as above he constructed three equally weighted portfolios representing small, medium and large companies. These were rebalanced monthly and in addition their market risks were equated through leverage. He then calculated the monthly differences between the three portfolios and regressed the differences on a market proxy. The resulting constants represent the average differences in return between the three portfolios. The arbitrage aspects of this approach can be shown as follows ;

Let;

R_{SL} = Returns on the small portfolios

R_{MD} = Returns on the medium portfolios

R_{LS} = Returns on the large portfolios.

Then;

$R_1 = R_{SL} - R_{LB} \quad 5(xiii)$

$R_2 = R_{SL} - R_{MD} \quad 5(xiv)$

$R_3 = R_{MD} - R_{LS} \quad 5(xv)$

Where;

$R_1 = R_2 + R_3.$

58. F. Black, M. Scholes, "The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns", Journal of Financial Economies, 1, 1974, pp. 1-22.

59. This procedure is necessary to avoid bias introduced by using estimated parameters as variables in the cross-sectional regression.

R_1 , R_2 and R_3 represent the arbitrage differences from a zero net investment involving going long in one portfolio and short in another. Thus $R_1 = R_S - R_L$ for example involves going long in the small portfolio and short in the large.

Banz reported results based on portfolio size of 10, 20 and 50 securities for the entire 1931 - 1975 period and for successive five year sub-periods between 1931 - 1975. We summarise Banz's results for portfolios of fifty securities in Table 5(x).

Banz draws several conclusions from these results.

1. Over the whole period a strategy of small firm portfolio investment would have been profitable over a strategy involving either medium or large firm portfolios. (0.89% per month and 1.01% per month respectively for portfolios of fifty securities. We note that the highest α_1 for the full period was reported for portfolios of ten securities. This figure of .0152 is the equivalent of approximately 19% p.a.)
2. As small firm portfolios typically have larger residual risk than large firm portfolios the investor following the small firm portfolio strategy would be left holding a poorly diversified portfolio.
3. The results are not conclusive over the sub-periods.

Overall Banz while recognising a size effect is extremely cautious both as to its importance and as to its interpretation. On reviewing his work we would agree with this conclusion. Interestingly he does draw on the work of Klein and Bawa to suggest that marketability

TABLE 5(x)

<u>Size and Performance</u> <u>Arbitrage Results of Banz</u>			
Period	α_1	α_2	α_3
1931 - 1975	.0101 (3.07)	.0089 (3.64)	.0012 (.85)
1931 - 1935	.0427 (2.35)	.0326 (2.46)	.0101 (1.42)
1936 - 1940	.0089 (.67)	.0064 (0.65)	.0025 (.49)
1941 - 1945	.0269 (2.17)	.0228 (2.02)	.0041 (1.68)
1946 - 1950	-.0036 (-.97)	-.0029 (-.83)	-.0007 (-.38)
1951 - 1955	.0013 (.32)	.0010 (.39)	.0003 (.11)
1956 - 1960	.0037 (.89)	.0011 (.45)	.0026 (.97)
1961 - 1965	.0024 (.31)	.0036 (.77)	-.0012 (-.24)
1966 - 1970	.0077 (1.91)	.0071 (2.43)	.0006 (.27)
1971 - 1975	.0098 (1.45)	.0083 (1.79)	.0015 (.43)

Notes :

1. α s are expressed in terms of monthly returns
2. t - statistics are shown in parenthesis
3. α_1 = small firms long large firms short
 α_2 = small firms long medium firms short
 α_3 = medium firms long large firms short.
4. Banz reported the following results for portfolios of ten and twenty securities for the full 1931-1975 period.

	<u>10 securities</u>	<u>20 securities</u>
α_1	.0152	.0148
α_2	.0130	.0124
α_3	.0020	.0024

premiums for small companies may well explain return differences.⁶⁰ The work by Klein and Bawa sources the marketability problems firmly with the possibility that information asymmetries may be greater in the market for small rather than large companies.

The second major study in this area is the work by Reinganum.^{61,62} Working with daily returns from the CRSP data base between 1962 and 1978 he grouped the securities into ten equally weighted portfolios on the basis of their December 31 market valuations. Thus rebalancing was completed annually. The total number of securities involved varied from 1457 to 2500.

The mean daily excess returns for each of the portfolios are shown in Table 5(xi).

From Table 5(xi) it is clear that the average excess returns available from the smaller value portfolios were considerably greater than those available from the larger portfolios. Indeed the return difference between portfolio 1 and portfolio 10 is 36%.

These results are of course presented without consideration of any possible risk differences between the various portfolios. Such an adjustment using Reinganum's OLS beta estimates would in fact widen the return divergence between the smallest and largest portfolios. However responding to a criticism raised by Roll that non-trading

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- 60. W. Klein, V. Bawa, "The Effect of Limited Information and Estimation Risk on Optimal Portfolio Diversification", *Journal of Financial Economics*, 5, 1977, pp. 89-111.
 - 61. M. Reinganum, "Misspecification of Capital Asset Pricing : Empirical Anomalies based on Earnings Yields and Market Values", *Journal of Financial Economics*, 9, 1981, pp. 19-46.
 - 62. M. Reinganum, "Abnormal Returns in Small Firm Portfolios", *Financial Analysts Journal*, March, 1981, pp. 52-56.

TABLE 5(xi)

Size and Performance			
Reinganum's Results			
Portfolio No.	Mean Annual Compound Return (%)	Beta	
		OLS	Aggregated Coefficients
1	42	.75	1.69
2	26	.87	1.64
3	22	.90	1.55
4	17	.96	1.50
5	16	.98	1.46
6	14	.97	1.39
7	12	.95	1.31
8	11	.97	1.27
9	9	.95	1.13
10	6	.98	.97

- Notes :
1. Portfolios are listed 1 to 10 in order of increasing value.
 2. Reinganum reports his results in terms of mean daily excess returns $\times 1000$. We have presented them in annual return format.

bias would result in lower beta estimates and that this bias may well be more pronounced amongst the lower value companies Reinganum recomputed his results using the Dimson aggregated coefficients method we discussed in Chapter 4.^{64,65,66} However even after this adjustment it is unlikely that the .72 beta difference between portfolios 1 and 10 could account for the observed difference in return levels. Indeed for it to do so would imply an extremely large and unlikely market risk premium of greater than 50%. ($36\%/.72$)

These two U.S. studies clearly suggest an empirical link between size and performance. In the U.K. a similar result is reported by the London Business School.⁶⁷ However work by both Moles and Gurney on the relationship between unit trust size and performance indicates only an extremely small and inconsistent relationship.^{68,69}

- (ii) The Relationship Between ITC Size and Performance : Before presenting the main empirical work it is worth considering a potentially observable implication stemming from the result that size and performance are related. Consider two ITCs identical in all respects apart from size and the number of shares outstanding. In

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64. R. Roll, "A Possible Explanation of Small Firm Effect", *Journal of Finance*, 36, 1981.
65. M. Reinganum, "A Direct Test of Roll's Conjecture on the Firm Size Effect", *Journal of Finance*, 37, 1982.
66. E. Dimson, "Risk Measures when Shares are Subject to Infrequent Trading", *Journal of Financial Economics*, June 1979, pp. 197-226.
67. London Business School, "Risk Measurement Service", September 1981, p.8.
68. P. Moles, "Components of Unit Trust Performance 1966-1975", *Investment Analyst*, 59, 1981.
69. J. Gurney, "Rank Correlation of Unit Trust Performance 1971-1975", *Investment Analyst*, 46, 1976.

particular note both that the only difference in the underlying portfolios will be one of scale and that dividend payments per share are equal. Given this albeit hypothetical situation how would we expect to observe size influencing returns? The answer is of course apparent when the phenomenon of the discount is introduced. Indeed in this ceteris paribus example differential returns can only come about when market participants express different preferences between the two ITCs. More specifically a wider discount on one ITC implies a larger return and vice-versa for a narrower discount. The following example clarifies this point:

	<u>ITC - A</u>	<u>ITC - B</u>
Assets per Share	100p	100p
Share Price	80p	90p
Price Discount	20%	10%
Dividend per Share	5p	5p

Assuming no change in the share price between t_0 and t_1 the return on an investment in each of the two ITCs will be :

ITC - A	6.25%
ITC - B	5.56%.

On the basis of this simple observation we will get some impression as to whether or not size and performance are related if there is a relationship between size and the discount level. However, it is extremely important to note that the generality of any conclusions based on discount levels is severely restricted. In particular we know very little about the precise way in which the market assesses

individual ITCs and their respective managements. We observe discounts and occasionally premiums but we cannot with any quantitative certainty rank or perhaps even identify all the various determinants. The model described above assumes not only all other factors to be the same for both ITCs but that these in fact are stationary over the time period considered. Conclusions based on a discount approach are at best corroborative.

With this restriction in mind the average Spearman rank-order correlation coefficient between portfolio size and discount levels was calculated for 50 ITCs over the 96 months to December 1980.⁷⁰ At -0.31 both the negativity and the weakness of the relationship are confirmed. This would tentatively support the conclusion that the smaller ITCs offered wider discounts and thus higher returns in the period under review.

In order to assess more accurately the relationship between size and performance we adopt Banz's arbitrage procedures described above. The monthly market capitalisation of the equity database ITCs were obtained for each of the 118 months to December 1980. At the end of each month the ITCs were ranked by market capitalisation and then divided into three groups. The first group or

70. Discussion of the computation of discount levels is delayed until Chapter 6 where we deal with the discount in more detail.

or portfolio represented the largest 32 ITCs while the second and third portfolios represented the ITCs ranked 33 to 64 and 65 to 97 respectively. The end result was 118 portfolios made up of large ITCs, 118 portfolios made up of medium sized ITCs and 118 portfolios made up of the smallest ITCs. Thus although the constituent ITCs making up these portfolios changed over time a size based difference between small, medium and large was maintained. Table 5(xii) details the size characteristics of these portfolios at the end of December 1980.

TABLE 5(xii)

<u>Investment Trust Companies</u> <u>Size Characteristics of the Small, Medium and Large Portfolios</u> <u>December 1980</u> (£m)			
Characteristics	Small	Medium	Large
Total Capitalisation	627.64	1286.90	3056.60
Average Capitalisation	18.46	37.85	89.90
Range of ITC Capitalisations			
- Minimum	8.13	26.59	55.90
- Maximum	26.36	54.53	253.80

It is evident from Table 5(xii) that both a considerable size range of ITCs was covered and that a substantial difference in size existed between the small medium and large categories. These points are important as it will be recalled that the equity data base was compiled on the basis of the largest 97 ITCs in the sector. Thus we accept that our sample space is biased towards the larger ITCs. However we suggest that the size ranges as shown in Table 5(xii) are large enough to justify a small medium and large categorisation.

With the ITC groupings complete 118 excess total return observations were calculated for each of the three portfolios. The returns were calculated as before with the exception that the weightings were the number of elapsed days between transactions rather than the square root of the number of days. This method of weighting allows the returns to be interpreted as average daily continuously compounded excess total returns rather than estimated daily returns. The more complex procedure for calculating estimated daily returns necessary for the computation of CAPM risk measures was not considered necessary for the arbitrage methodology and thus the perhaps more intuitive average return approach was adopted.

Having established the time series of returns for each of the portfolios the return differentials between the three portfolios were calculated on the basis of equation 5(xiii), 5(xiv) and 5(xv). Finally the market component underlying the return differentials was removed by regressing the differentials on the average daily excess total market return with the market again being defined as

the total return on the FTA-AS index. The resulting constants which we noted above could be interpreted as size effects are reported in Table 5(xiii).

TABLE 5(xiii)

Investment Trust Companies			
Average Returns Associated with Size Differentials			
Simple Returns-% pa			
Equation	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$
$R_1 = R_{SL} - R_{LS} = \hat{\alpha}_1 + \hat{\beta}_{1m} \tilde{R}_{1mt} + \tilde{\epsilon}_{1t}$	-3.48 (-1.02)		
$R_2 = R_{SL} - R_{MD} = \hat{\alpha}_2 + \hat{\beta}_{2m} \tilde{R}_{2mt} + \tilde{\epsilon}_{2t}$		-2.64 (-1.03)	
$R_3 = R_{MD} - R_{LS} = \hat{\alpha}_3 + \hat{\beta}_{3m} \tilde{R}_{3mt} + \tilde{\epsilon}_{3t}$			-.82 (-0.45)

Notes : "t" statistics are shown in parenthesis.

From Table 5(xiii) it is clear that the portfolios of large ITCs have on average over the 118 month period outperformed the portfolios of small and medium sized ITCs. However this outperformance is not statistically significant. On examination it is apparent that the bulk of this size based differential is sourced from R_2 the differential performance of medium sized ITCs over small ITCs. We are thus initially drawn to the conclusion that size and performance are positively rather than negatively related as suggested

by the work of Banz and Reinganum.

Several possible explanations for our results were explored. Firstly as noted above none of our results are statistically significant. It could be that observations over a longer time period would give in a purely statistical sense more meaningful results. On the other hand we did note in Section 3 the difficulties associated in relating statistical significance to financial relevance. Secondly we have made no adjustment for differing risk levels between small, medium and large portfolios. Thus in removing the market component from R_1 , R_2 and R_3 we have implied an assumption that the market risk levels of the three portfolios were approximately equal. To test whether this was a reasonable assumption or not R_{SL} , R_{MD} and R_{LG} that is the excess returns on the portfolios rather than the return differences between them were regressed on the excess market return to obtain approximate beta and R^2 estimates over the 118 observations. Table 5(xiv) reports the results.

TABLE 5(xiv)

Investment Trust Companies			
Small, Medium and Large Portfolio Betas			
Description	Small Portfolios	Medium Portfolios	Large Portfolios
$\hat{\beta}$	.84 (18.79)	.92 (21.73)	.96 (23.26)
R^2	.75	.80	.82

Notes : 1. "t" statistics are reported in parenthesis.

From Table 5(xiv) it is evident that while the three portfolios share similar levels of diversification the small ITC portfolios has a lower market risk coefficient. Thus a leverage adjustment to the returns on the small portfolios would appear valid. Such an adjustment would be expected to increase R_{SL} which in turn would reduce the negative differentials R_1 and R_2 . Unfortunately the return increase that would result in removing the 14% difference between the beta of the small and large portfolios would not be sufficient to account for the -3.48% p.a. return difference. To do so would imply a market risk premium of the order of 28.33% p.a. (3.4/.12). We suggest that this is unrealistically high. Indeed we noted earlier in our discussion of performance estimators that the cumulative (118 month) risk premium was only 25.608%. Thus while differing risk levels may well be a contributory factor the effects would be insufficient to account for the observed differences.⁷¹

Throughout our study we have examined returns from the point of view of a gross investor. It is possible that the higher returns on the large portfolio are to compensate for distributions made in a tax inefficient manner. More specifically given the higher rates of taxation on dividend income as compared to capital gains did the large ITCs tend to offer higher yields than the smaller ones? To examine this possibility the percentage of the total market capitalisation of the 97 ITCs at December 31 1980 represented by the three yeild groups used in Chapter 4 Section 4 were compared. The results are shown in Table 5(xv).

As shown in Table 5(xv) the size proportions of the low, medium

7. The average market risk premium estimated by the LBS over the 1919-1977 period was perhaps a surprisingly high 9.2% p.a.
E. Dimson, R. Brealey, "Risk Premiums on U.K. Equities", Investment Analyst, 52, 1978.

TABLE 5(xv)

Investment Trust Companies			
Average Portfolio Yields and Market Capitalisation			
(%)			
Description	Low Yield Portfolio	Medium Yield Portfolio	High Yield Portfolio
Average Portfolio Yield	2.27	3.10	4.12
% of ITC Market Capitalisation	35	35	31

and high yield portfolios were approximately equal at December 31 1980. Thus it would appear unlikely that the larger ITCs are associated with higher yields and hence the possibility of explaining R_1 on the basis of distribution policy is reduced.

Our final exploration into the results reported in Table 5(xiii) was particularly revealing. To test for the consistency of the results the 118 month period was divided into two equal halves and the three regressions involving R_1 , R_2 and R_3 were then performed on each of the sub-periods. The results are reported in Table 5(xvi).

Although the results are again not statistically significant it is obvious that the bulk of the overall excess differential in favour of large ITCs was obtained in the earlier period with something of

TABLE 5(xvi)

<u>Investment Trust Companies</u> <u>Average Returns Associated with Size Differentials</u> Period 1 : February 1971-January 1976 Period 2 : February 1976-December 1980 (Simple Returns % pa)						
Equation	Period 1			Period 2		
	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$
$R_1 = R_{SL} - R_{LS} = \hat{\alpha}_1 + \hat{\beta}_{1m} \tilde{R}_{1mt} + \tilde{\epsilon}_{1t}$	-6.56 (-1.21)			-0.34 (-0.08)		
$R_2 = R_{SL} - R_{MD} = \hat{\alpha}_2 + \hat{\beta}_{2m} \tilde{R}_{2mt} + \tilde{\epsilon}_{1t}$		-6.15 (-1.49)			0.90 (0.31)	
$R_3 = R_{MD} - R_{LS} = \hat{\alpha}_3 + \hat{\beta}_{3m} \tilde{R}_{3mt} + \tilde{\epsilon}_{1t}$			-0.41 (-0.14)			-1.24 (-0.62)

Notes : 1. "t" statistics in parenthesis.

a reversal taking place during the later period.

The first half of the 1970s was a period of crises in the financial markets and it does appear that the larger ITCs were able to weather this storm considerably better than their smaller counterparts. That there may be a trend in more recent years towards reversing this earlier position is of course as equally interesting and worthy of explanation. Indeed such a result would be in line with the larger studies of size and performance noted earlier. Unfortunately our

empirical results on the later period can only be interpreted as consistent with the above scenario rather than firm support for the presence of liquidity premiums in the ITC equity market.

Summary : We have covered several aspects of the achieved performance of ITCs in this chapter based primarily on performance measures derived from CAPM. Overall the performance achieved was not spectacular. In addition we pointed out several criticisms of our methodology which we consider serious but not sufficiently so to reject the CAPM approach. Finally we described an alternative methodology the APT and suggested that its purported advantages were less than might at first appear. However in the context of APT we examined an interesting aspect of performance involving the possibility of liquidity premiums existing in the ITC equity market. Under the conditions of CAPM equilibrium such premiums would not be expected. Our results were unfortunately inconclusive with those from the second half of the decade providing some support for the hypotheses and those from the earlier years suggesting its rejection.

CHAPTER SIX

THE PRICE DISCOUNT TO NET ASSET VALUE

Introduction

Section 1 Discount Estimates

Section 2 The Financial Characteristics
 of ITC Portfolios

Section 3 Reported Determinants of the
 Discount

Summary

INTRODUCTION : The most pervasive statistic that accompanies any discussion of ITCs is "the discount". More specifically it is frequently observed that ITC equity valuations are considerably less than those for underlying portfolios. Rather less frequently equity valuations in excess of portfolio valuations are observed. These are referred to as premiums while the former are known as discounts. The importance attached to differences between equity and portfolio valuations varies considerably from commentator to commentator. In general greater importance is attached to these differences by those actively involved in the marketing of ITC equities than by researchers. To a very large extent this is because the latter group find it difficult to analyse a phenomenon that given any reasonable level of market efficiency just should not exist. Why indeed should one portfolio of assets attract two different market valuations? We note Sharpe's comment;

"Explanation of the behaviour of closed-end fund prices provides a challenge for the person who believes that capital markets are perfectly efficient. For one not firmly committed to such a view, the purchase of shares of closed end companies at prices sufficiently below net asset value may provide an opportunity for superior performance."¹

While we find difficulty in explaining the levels and persistence of discounts during the 1970s their effect on the ITC sector should not be underestimated. In particular they made it difficult for new funds to be raised. Perhaps more importantly they represented a focus of criticism on the sector which has since the mid 1970s resulted in the occasional take-over, increasing pressure to unitise and as we noted in the previous chapter the adoption by managers of new investment strategies.

1. W. Sharpe, "Investments", Prentice-Hall, New Jersey 1981, p.530.

Our approach to this chapter is not to present any new insight into the reasons behind portfolio and equity valuation differences. We confine ourselves to more modest objectives. In section 1 we provide discount estimates for a sample of ITCs. In Section 2 we review the financial characteristics of ITC portfolios. Finally in Section 3 we discuss various reported hypotheses on the determinants of discount.

1. Discount Estimates : Monthly estimates of the discount were calculated for 50 ITCs for the 96 month period to December 1980. The sample size and period covered reflected considerations of coverage and data availability. These were averaged first of all to give a mean discount per ITC over the 96 month period and secondly to give an equally weighted monthly discount estimate for the full sample of 50 ITCs. Individual ITC discounts were calculated as follows :

$$\tilde{D}_{it} = (N_{it} - E_{it})/N_{it} \quad 6(i)$$

where;

\tilde{D}_{it} = Discount on the i^{th} ITC at the end of month t

N_{it} = Net asset value of the i^{th} ITC at the end of month t

E_{it} = Market capitalisation of the ordinary equity of the i^{th} ITC at the end of month t .

Market capitalisations were obtained from our own database and where necessary were adjusted to include the equity rights from any outstanding convertible issues. Net asset values were made available by Wood Mackenzie & Co. These were defined as

$$\text{NAV} = (\text{TA} - \text{CL}) - \text{PC}$$

6(ii)

where;

NAV = Net asset value including accrued dividends

TA = Total assets valued at market

CL = Current liabilities

PC = Prior charges valued at market.

Prior charges include all the balancing items with the exception of ordinary equity which is defined to include the full conversion rights of any convertible issues outstanding. Controverses occasionally arises over the use of market rather than book valuation for prior charges. However we suggest that such controversy is misplaced as it is difficult to establish the precise economic content of book value.

As far as total assets are concerned all are valued at market with the exception of unquoted securities which as we noted in Chapter 1 are usually valued at the lower of cost of directors' valuation. During the period of exchange controls the full premium was included in the valuation of foreign securities with any surrender liability due on unrealized foreign security gains shown as a contingent claim off the balance sheet.

We report our discount estimates for individual ITCs in summary form in Table 6(i) and in greater detail in Table 6(ii). The monthly average sample discounts are plotted out on Graph 6(i).

Looking first at the individual ITC discounts perhaps the most interesting highlight is the absolute size of the discounts. With a sector average

TABLE 6(i)

<u>Investment Trust Companies</u> <u>Summary Discount Estimates</u> <u>50 ITCs : 96 months to 12/80</u>	
Description	%
Average	23.358
Minimum	10.806
Maximum	29.989

of 23% over the 96 month period we need not be surprised that the sector has experienced take-over and unitisation pressure from a number of institutions. In addition the varying discount levels between ITCs is really quite narrow with over 40 of the sample lying in the range 20 to 30%. It is clearly difficult to generalise and indeed there are several outliers with very low discounts however the narrowness of the band may suggest that there are common market wide elements underlying discount levels.

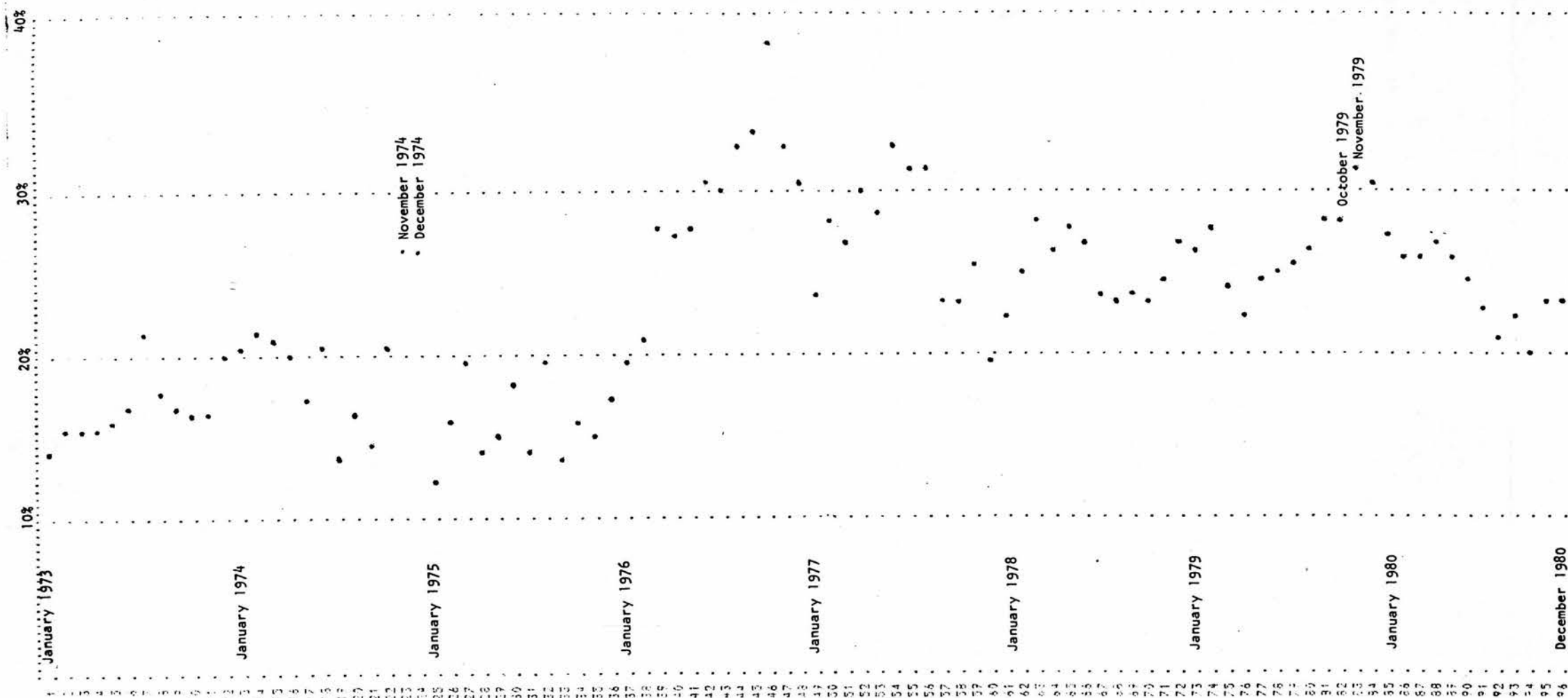
While there is only a limited average discount range for individual ITCs Graph 6(i) indicates that the monthly average discount for the sample as a whole varied considerably between a low of approximately 12% in January 1975 and a high of almost 40% in October 1976. We suggest the following three points from Graph 6(i) are worthy of note.

TABLE 6(ii)

Investment Trust Companies			
Average Discounts			
96 months to 12/80			
Trust	%	Trust	%
Alliance Investment	27.224	London & Holyrood	26.194
Alliance Trust	20.096	London Provincial	26.829
American	20.603	Monks	27.750
Ashdown	27.539	Murray Caledonian	21.740
Atlas Elec & General	25.260	Murray Clydesdale	21.484
Berry	27.970	Murray Northern	22.608
Bishopgate	29.316	Murray Western	22.058
Border & Southern	26.154	1928	22.185
British Assets	12.197	Northern American	22.888
Broadstone	22.027	Scottish American	14.995
Capital & National	26.831	Scottish Mortgage	24.768
Cardinal	27.188	Scottish National	25.010
Contin. & Industrial	18.846	Scottish Northern	12.770
Contin. Union	26.884	Scottish United	17.354
Edinburgh Investment	14.734	Securities	27.283
Electric & General	22.736	Sphere	26.844
First Scott. American	23.044	Sterling	24.550
General Consol.	24.341	Stockholders	22.451
General Funds	29.989	Throgmorton	13.014
Glasgow Stockholders	25.007	Trans-Ocean	25.264
Great Northern	24.403	Trust Union	25.447
Guardian	24.408	UBS	26.896
Industrial & General	25.532	US & General	26.075
Investors' Capital	20.391	Winterbottom	22.501
Lakeview	24.403	Witan	22.089

GRAPH 6(i)

Investment Trust Companies
Average Monthly Discount - 50 ITCs Equally Weighted
96 months to 12/80



- (i) The average discount levels over the 96 month period can be divided fairly easily into a low discount plateau lasting up until mid-1976 and a high discount plateau from mid 1977 up until the end of the decade. The high level of discounts in this later period is particularly revealing. Indeed it is clear that in spite of changes in investment attitudes towards more active management strategies there was no corresponding reduction in the potential for institutional pressure on the sector.
- (ii) The intervening period between mid 1976 and mid 1977 represented a period of great instability in discount levels. We note some of the general economic characteristics of this period in Exhibit 6(i).

EXHIBIT 6(i)

<u>General Economic Characteristics</u> <u>Mid 1976 - Mid 1977</u>		
Date		Description
1976	June	£5,300m IMF facility announced
	Septmeber	Threat of seamen's strike
	September	MLR raised to 13%
	October	Sterling collapse
	October	MLR raised to 15%
	December	£3,900m IMF 3 year loan
1977	January	Interest rates begin to fall
	February	Record trade deficit
	March	Interest rate reductions
	June	Successful BP rights issue

Given the economic instability of this period and in particular of late 1976 it is perhaps not too surprising that this period was one of considerable fluctuation in discount levels.

- (iii) Finally we identify two specific events. First of all as we noted in Chapter 1 November and December 1974 saw the bottoming out of a severe bear crash with January 1975 witnessing a very substantial stock market rise. The average discount levels for each of these three months were approximately 28%, 28% and 12% respectively. This apparently negative relationship between market movements and discount levels in an area we look at in more detail in section 3.

The second specific event to note is the removal of exchange controls on October 24th 1979. Following the very swift abolition of the investment currency market many ITCs had to make substantial portfolio write-offs in order to remove the premium content of their foreign security holdings. Interestingly as the discount widened in November 1979 to its highest level since mid 1979 it would appear *ceteris paribus* that the price effect following the removal of exchange controls was rather greater than the portfolio effect!

We now move on to examine the financial characteristics of ITC portfolios in more detail.

2. The Financial Characteristics of ITC Portfolios : Our approach to this section is to estimate and comment briefly on portfolio return, risk and performance measures. We do this in the context of comparing

the portfolio results with those derived from ITC equities.

- (i) Portfolio Returns : Monthly portfolio returns were calculated for the 50 ITCs used in the previous section over the 96 month period to December 1980. The return algorithm was similar to that used for the computation of equity returns.

$$\tilde{R}_{int} = \text{Log} \left[\frac{(NC - NO + DP)}{NO} + 1 \right] \quad 6(iii)$$

where;

$$\tilde{R}_{int} = \text{Portfolio return on the } i^{\text{th}} \text{ ITC for month } t$$

$$NC = \text{Closing net asset value as per equation 6(ii).}$$

$$NO = \text{Opening net asset value as per equation 6(ii)}$$

$$DP = \text{Gross dividend paid.}$$

Two points should be noted with regard to equation 6(iii). First of all the returns are not computed on a trade to trade basis. We therefore do not account for non-trading amongst the constituent securities. The observations used are based on month end mid-market observations which as we noted in Chapter 3 do not necessarily correspond to either a transaction date or value. While this is clearly a data weakness we have no practical way of estimating trade to trade returns short of reconstructing the portfolios and their transactions. We note in passing that Dimson and Marsh in fact offer such a service.² The problems raised by this data weakness are of course more acute in the context of risk measurement which we deal with below.

2. E. Dimson, P. Marsh, 'A New Approach to Measuring Selection Skills', Investment Analyst, No. 60, 1981.

Secondly note that we consider the dividend disbursement date as the relevant date on which to add in the dividend component of total return. While equity prices are affected on the XD date portfolio values will be reduced on the date that the company accrues the dividend payable. Strictly speaking this accrual can only be formalised after the directors' dividend proposals have been approved by the members. However in practice it is accrued from the announcement date. We noted earlier that our net asset values contain an estimated dividend accrual and while it would be more accurate to reverse the actual accrual and not add in any dividend disbursement we follow the rather simpler practice of adding in the dividend paid at the disbursement date. The cost of this simplification will be to increase the observed variance in total returns.

It is clear from the various explanatory points raised in our discussion of portfolio returns and net asset values that a characteristic of empirical work in this area is that the apparent ease with which portfolio statistics can be computed does rather hide several important definitional points. These would include the use of equity diluted by convertible rights, the valuation of unquoted securities, in some cases the valuation of prior charges and in our own work the dividend assumption. We suggest that awareness of these problems is at least as useful in interpreting results as any, possibly arbitrary attempts, to correct for data deficiencies. In this context we are reminded of our arguments in Chapter 3 on whether or not to make a tax adjustment to equity returns.

Our portfolio return measures are reported in summary form in

Table 6(iii). We also include in this Table summary results for the equity returns on the 50 ITCs and the FTA-AS index over the same 96 month period.

The equity returns are computed on the basis of trade to trade returns discussed in Chapter 3.

Individual ITC results are shown in detail in Table 6(iv). Before discussing these results it should be noted that we have adopted a similar presentation format as used with our equity returns in Chapter 3.

$$\text{i.e. Annual Returns} = \left[\left[\text{Antilog} \left[\sum_{i=1}^{12} \tilde{R}_{int} \right] \right] - 1 \right] 100$$

$$\text{96 Month Returns} = \left[\left[\text{Antilog} \left[\sum_{i=1}^{96} \tilde{R}_{int} \right] \right] - 1 \right] 100$$

where;

$$\tilde{R}_{int} = \text{As defined for equation 6(iii)}$$

TABLE 6(iii)

/ over

TABLE 6(iii)

<u>Investment Trust Companies</u> <u>Average Portfolio and Equity Returns - Summary</u> <u>50 ITCs : 96 months to 12/80</u> (%)							
Year	Equity Returns			Portfolio Returns			FTA-AS
	Average	Minimum	Maximum	Average	Minimum	Maximum	
1973	-36.859	-49.047	-19.877	-31.080	-40.239	-23.966	-30.385
1974	-47.463	-66.679	-30.253	-42.834	-58.678	-30.800	-49.803
1975	128.949	98.377	186.942	107.470	40.958	170.468	150.262
1976	-1.474	-18.395	12.241	16.227	1.042	66.801	1.432
1977	40.890	9.459	87.531	20.960	1.906	103.139	50.082
1978	7.234	-9.212	29.841	13.273	0.441	27.801	9.135
1979	-1.031	-22.672	17.559	2.395	-7.268	16.764	8.931
1980	59.918	37.150	98.484	43.026	29.979	55.665	33.982
96 mths to 12/80	79.885	5.174	155.774	87.405	49.556	176.029	109.372

TABLE 6(iv) 1/2

Investment Trust Companies									
Portfolio Returns									
50 ITCs : 8 years to 12/80 (%)									
Trust	1973	1974	1975	1976	1977	1978	1979	1980	96 months to 12/80
Alliance Investment	-31.766	-42.692	114.548	12.604	21.986	18.861	4.927	52.742	119.528
Alliance Trust	-29.431	-32.370	77.351	11.989	21.470	8.175	-3.896	34.600	61.119
American	-36.442	-56.730	123.859	20.821	24.940	8.661	6.395	45.950	56.814
Ashdown	-29.497	-40.684	112.771	14.484	15.838	12.486	0.459	47.950	97.283
Atlas Elect. & Gen.	-31.841	-48.971	160.799	3.984	40.465	12.456	-0.210	47.291	118.994
Berry	-39.208	-38.949	50.598	36.917	9.600	27.006	10.392	54.614	81.817
Bishopgate	-29.953	-52.724	129.329	11.418	36.515	10.412	1.882	45.085	88.523
Border & Southern	-28.133	30.800	77.309	10.589	21.757	17.278	-1.452	41.811	94.652
British Assets	-36.199	-58.602	125.407	37.940	19.369	15.672	8.053	29.979	59.258
Broadstone	-31.325	-42.486	127.728	11.473	25.650	11.712	0.577	46.414	107.254
Capital & National	-28.979	-36.857	98.512	15.226	19.396	14.751	0.203	39.285	96.143
Cardinal	-30.478	-46.275	111.234	7.220	28.654	9.298	16.764	50.392	109.038
Contin. & Industrial	-25.082	-51.092	171.468	16.686	20.637	4.856	7.528	39.913	120.877
Contin. Union	-30.032	-44.401	140.944	7.648	24.702	9.618	-2.544	39.541	87.566
Edinburgh Investment	-31.080	-41.192	100.472	17.961	26.480	7.739	14.541	55.665	131.926
Electric & General	-39.057	-52.192	65.378	66.801	4.362	18.418	3.484	45.499	49.556
First Scott. American	-31.552	-39.811	100.867	15.451	14.790	13.318	-6.268	37.503	60.171
General Consolid.	-27.345	-42.256	108.784	14.172	27.681	10.935	8.115	34.225	105.562
General Funds	-36.554	-34.267	101.819	12.045	23.397	27.801	3.359	45.381	140.386
Glasgow Stockholders	-32.195	-41.331	111.794	14.527	13.521	7.512	12.883	41.510	88.123
Great Northern	-28.728	-46.508	114.633	3.459	32.758	8.105	1.361	35.376	66.720
Guardian	-35.648	-50.998	157.673	5.784	26.868	0.441	-1.124	44.671	70.744
Industrial & General	-25.856	-45.373	121.323	7.116	30.539	12.939	5.330	40.751	109.870
Investors Capital	-37.604	-36.222	123.054	20.347	2.569	12.493	0.733	44.581	79.514
Lakeview	-29.554	-33.081	90.775	11.076	23.924	12.288	0.833	43.375	100.960

/ cont'd

TABLE 6(iv) 2/2

Trust	1973	1974	1975	1976	1977	1978	1979	1980	96 months to 12/80
London & Holyrood	-29.554	-33.081	90.775	11.076	23.924	12.288	0.833	43.375	100.960
London Provincial	-25.658	-34.032	92.447	15.404	13.594	12.899	-2.725	39.694	89.791
Monks	-29.079	-39.256	96.471	17.596	6.726	8.367	5.636	39.909	70.136
Murray Caledonian	-30.981	-39.954	74.218	23.178	7.782	20.184	-5.673	45.189	58.841
Murray Clydesdale	-32.369	-40.747	78.773	23.103	8.231	19.248	-7.293	45.442	53.473
Murray Northern	-32.349	-41.290	77.050	21.158	7.186	17.666	-4.626	45.352	50.192
Murray Western	-32.074	-38.942	76.999	22.830	8.769	18.290	-5.244	44.560	58.915
1928	-27.881	-41.771	122.614	14.039	16.129	15.923	-2.618	39.623	95.141
Northern American	-32.403	-43.458	105.932	17.026	15.113	15.740	-7.268	41.049	60.513
Scottish American	-32.783	-56.044	91.332	20.115	47.723	5.296	14.792	43.702	74.229
Scottish Mortgage	-28.695	-32.806	75.399	18.387	4.590	8.092	4.726	38.122	62.698
Scottish National	-32.499	-43.817	117.724	13.171	14.311	8.929	7.107	43.772	79.177
Scottish Northern	-31.734	-58.678	112.377	17.483	42.428	10.903	16.577	43.457	85.927
Scottish United	-27.294	-32.481	87.521	21.838	1.906	21.391	4.109	40.059	102.307
Securities	-40.329	-42.355	130.487	20.232	21.886	11.832	-2.821	37.983	74.222
Sphere	-31.392	-46.052	139.517	7.822	26.962	13.341	-2.559	40.639	88.496
Sterling	-21.429	-38.432	90.169	16.046	15.682	12.127	-3.447	32.275	76.849
Stockholders	-29.293	-37.994	92.055	12.983	21.935	13.990	-2.404	55.401	99.659
Throgmorton	-30.378	-57.734	140.733	1.042	103.139	30.533	10.874	30.177	176.029
Trans-Ocean	-29.092	-37.477	112.397	16.065	19.341	10.911	-0.733	44.429	107.399
Trust Union	-28.161	-41.321	126.345	2.955	32.132	10.457	3.899	44.258	114.888
UBS	-23.966	-35.841	95.022	11.726	16.892	13.006	-2.037	39.579	91.988
USA General	-28.341	-41.210	118.626	13.357	14.172	9.885	3.127	40.382	89.630
Winterbottom	-34.501	-48.429	117.471	22.945	4.938	8.235	10.986	46.845	67.180
Witan	-36.465	-44.294	82.273	18.299	16.189	17.789	-2.829	53.418	55.661

The following points should be noted from Tables 6(iii) and 6(iv) :

- (i) Average portfolio returns over the 96 month period were marginally higher than those achieved by ITC equities.
- (ii) Both average portfolio and average equity returns were less than those achieved on the FTA-AS index.
- (iii) The range of average portfolio returns (126.473%) was considerably less than that for average equity returns (150.627%)
- (iv) There is a broad similarity in the year to year movements between the average portfolio and equity returns and indeed between these returns and those on the FTA-AS index.

What Tables 6(iii) and 6(iv) fail to disclose is whether or not the average results are hiding substantial differences in achieved return at the individual ITC level. To remedy this the cumulative 96 month equity and portfolio returns for each of the 50 ITCs were plotted out. These are shown in Graph 6(ii).

From Graph 6(ii) we observe further evidence of the similarity between equity and portfolio returns. The relationship is clearly close and positive. Indeed the Spearman rho between the sets of returns was noted as 0.848.

It is difficult to find any controversial points in these results. However given that both sets of returns were generated from the same

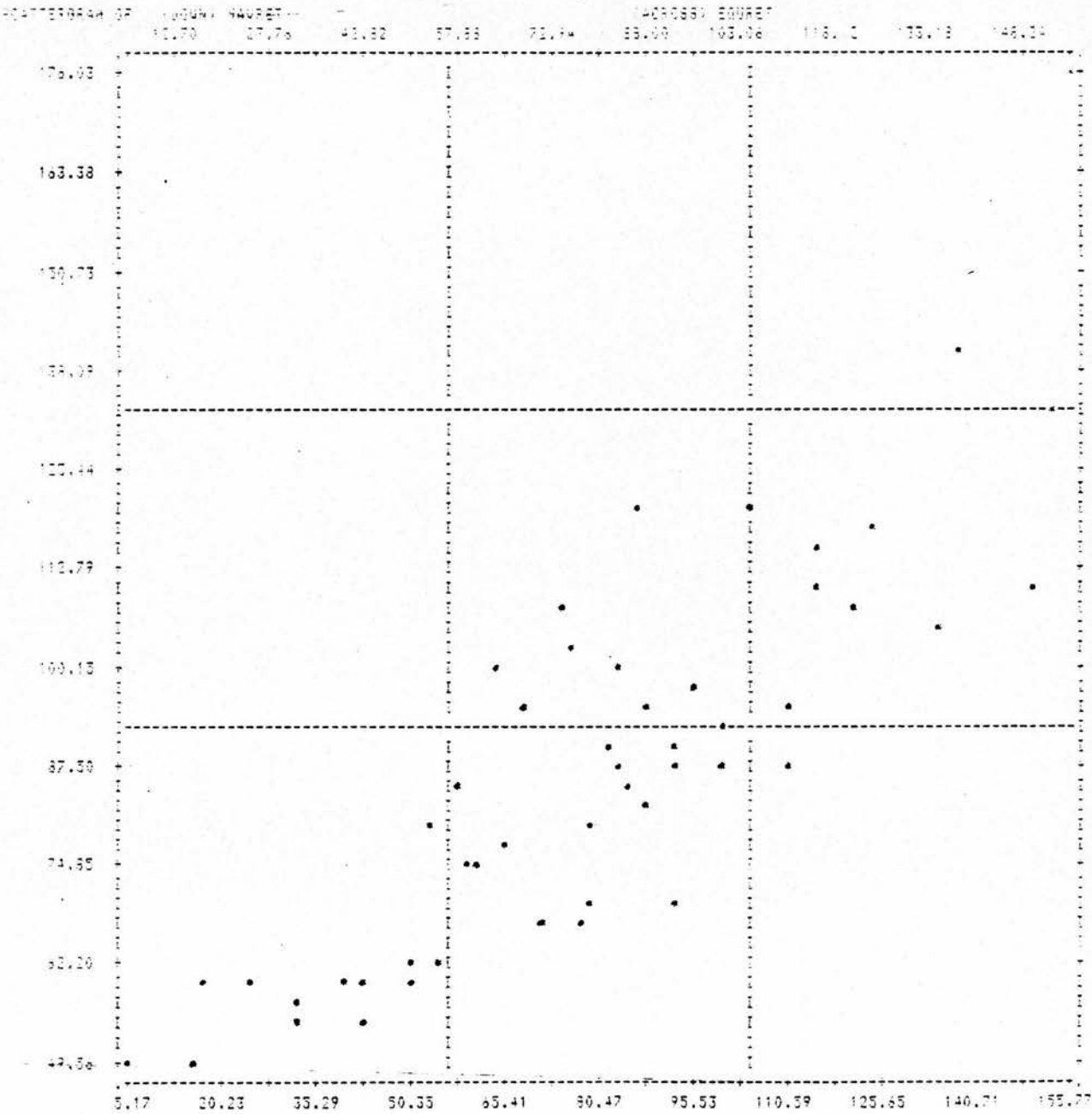
GRAPH 6(ii)

Investment Trust Companies

Cumulative Portfolio (Navret) and Equity (Equret) Returns

50 ITCs : 96 mths to 12/80

NAVRET - Down
EQURET - Across



assets we would clearly expect to find a close relationship. Perhaps the most interesting observation is the absolute difference in achieved returns. We noted that on average portfolio returns slightly out-performed equity returns but that both were less than those achieved on the FTA-AS index. Interestingly Corner and Matatko working with 92 ITCs between 1974 and 1979 report average annual portfolio returns of 23.4% and average annual equity returns of 26.1%. If these averages were valid over our 8 year period then significant differences would exist between our results and those of Corner and Matatko.³ However after adjusting Corner and Matatko's results by the inclusion of our estimates for 1973, 1974 and 1980 a reasonable reconciliation is possible. We show this in Exhibit 6(ii).

While noting that there is a 2.022% p.a. ($8.166\% - 6.144\%$) portfolio return differential and a 0.844% p.a. ($7.613\% - 6.769\%$) equity return differential we suggest that the net annual differential of 1.178% p.a. ($0.553\% + 0.625\%$) is negligible especially after consideration of sample size differences.

- (ii) Portfolio Risk : Total market and unique risk measures were calculated for each of the 50 ITCs on the 96 monthly observations to December 1980. Again the procedure adopted was similar to that used for the computation of equity risk measures with the important exception that monthly rather than trade to trade returns were used. As we noted in Chapter 4 where non-trading is ignored the dates of the transaction observations on the independent dependent variables may not be aligned. This result is an underestimate of the covariance term relating the two variables.

3. D. Corner, J. Matatko, "Investment Trust Portfolio Performance - Measurement and Determinants", Investment Analyst, 1981, pp. 9-13.

EXHIBIT 6(ii)Investment Trust CompaniesReturn ReconciliationsCorner and MatatkoLyallA] Portfolio Returns :

Cumulative Returns (Log form)

5 years to 12/79 (23.4% p.a.)
 8 years to 12/80 (87.405%)

1.051

.628

Add

1973 (-31.080%)
 1974 (-42.834%)
 1975 (43.026%)

-0.372
 -0.559
 0.357

0.477

.628

In Simple Returns

Cumulative (8 years)
 Average Annual

61.123%
 6.144%

87.386%
 8.166%

B] Equity Returns :

Cumulative Returns (Log form)

5 years to 12/79 (26.1% p.a.)
 8 years to 12/80 (79.885%)

1.159

.587

Add

1973 (-36.859%)
 1974 (-47.463%)
 1980 (59.918%)

-0.460
 -0.644
 0.469

0.524

.587

In Simple Returns

Cumulative (8 years)
 Average Annual

68.877%
 6.769%

79.859%
 7.613%

C] Portfolio Returns Less Equity Returns :

Cumulative (8 years)
 Average Annual

-7.754%
 -0.625%

7.527%
 0.553%

The potential severity of this problem is unfortunately rather difficult to estimate. Interestingly the alternative beta estimates calculated by Reinganum using both OLS and aggregated coefficients methodologies suggest that the under estimation may well be quite serious.⁴ We reported Reinganum's results in Table 5(xi).

Unfortunately we can do no more than be aware of this problem.

The three risk measures were calculated as follows :

$$\begin{aligned}\text{Total Risk (t)} &= \hat{\sigma}(\tilde{R}_{int}) \\ \text{Market Risk (m)} &= \hat{\beta}_{inm} \hat{\sigma}(\tilde{R}'_{mt}) \\ \text{Unique Risk} &= \sqrt{(t^2 - m^2)}\end{aligned}$$

The market risk coefficient was estimated from the following equation.

$$\tilde{R}'_{int} = \hat{\alpha}_{in} + \hat{\beta}_{inm} \tilde{R}'_{mt} + \tilde{\epsilon}_{int} \quad 6(iv)$$

where;

$$\tilde{R}_{int} = \tilde{R}_{int} - R_{ft}$$

$$\tilde{R}'_{mt} = \tilde{R}_{mt} - R_{ft}$$

with;

$$\tilde{R}_{int} = \text{as per equation 6(iii)}$$

$$\tilde{R}'_{mt} = \text{Log } ((\text{FTC} - \text{FT0} + \text{D})/\text{FT0}) + 1$$

$$R_{ft} = \text{Log } (((\text{TB}_{t-1})/12 (1-\text{TB}_{t-1}))) + 1$$

4. M. Reinganum, "A Direct Test of Roll's Conjecture on the Firm Size Effects", Journal of Finance, 37, 1982.

and;

FTC = Closing FTA-AS index value for month t

FTO = Opening FTA-AS index value for month t

TB = Annual equivalent of the 3 month Treasury Bill

= discount rate

D = (DY.FTC)/1200

where DY = Dividend yield on the FTA-AS index
at the end of month t.

As with our equity risk measures we present them in annual return format as follows

$$\text{Total risk (T)} = ((\text{Antilog}(\sqrt{\hat{\sigma}^2(\tilde{R}_{int})}.12)) - 1) 100$$

$$\text{Market risk (M)} = \hat{\beta}_{inm} ((\text{Antilog}(\sqrt{\hat{\sigma}^2(\tilde{R}_{mt})}.12)) - 1) 100$$

$$\text{Unique risk} = \sqrt{T^2 - M^2}$$

Our portfolio risk results are summarised in Table 6(v) along with the comparative equity risk measures calculated using the trade to trade returns as described in Chapter 4 over the same 96 month period. The individual ITC measures are shown in Table 6(vi).

We make the following points with regard to Tables 6(v) and 6(vi).

- (i) The coefficients of determination interpreted either as "goodness of fit" statistics or as levels of diversification are very similar for the equity and portfolio risk estimating equations.

TABLE 6(v)

Investment Trust Companies						
Average Equity and Portfolio Risk Measures - Summary						
50 ITCs : 96 months to 12/80 (%)						
Trust	Equity Risk			Portfolio Risk		
	Average	Minimum	Maximum	Average	Minimum	Maximum
Total Risk	38.850	30.406	56.950	29.327	23.957	35.077
Beta	0.963	0.708	1.185	0.727	0.501	0.972
"t"	15.36	9.88	22.10	15.95	7.83	27.52
"SE"	0.06	0.04	0.08	0.048	0.026	0.074
Market Risk	30.478	22.411	37.573	24.824	17.084	33.145
Unique Risk	23.850	15.479	42.796	14.991	6.474	24.274
R ²	0.660	0.495	0.808	0.690	0.388	0.903

TABLE 6(vi)

Investment Trust Companies											
Portfolio Risk Measures											
50 ITCs : 96 months to 12/80 (%)											
Trust	Total Risk T	Market Risk $\hat{\beta}_{im}$	Risk M	Unique Risk $\sqrt{(T^2-M^2)}$	R ²	Trust	Total Risk T	Market Risk $\hat{\beta}_{im}$	Risk M	Unique Risk $\sqrt{(T^2-M^2)}$	R ²
Alliance Investment	29.353	.761	25.950	13.712	.751	London & Holyrood	26.867	.703	23.972	12.131	.751
Alliance Trust	24.344	.611	20.835	12.590	.675	London & Provincial	23.957	.605	20.631	12.177	.682
American	32.436	.828	28.235	15.964	.758	Monks	27.528	.685	23.359	14.565	.680
Ashdown	29.129	.761	25.950	13.232	.761	Murray Caledonian	26.692	.575	19.631	18.085	.503
Atlas Electric & Gen.	34.237	.945	32.225	11.563	.888	Murray Clydesdale	26.999	.592	20.187	17.828	.525
Berry	25.208	.501	17.084	18.535	.423	Murray Northern	26.824	.575	19.608	18.304	.500
Bishopgate	33.680	.911	31.065	13.011	.847	Murray Western	26.824	.591	20.153	17.702	.529
Border & Southern	24.172	.613	20.903	12.138	.687	1928	29.487	.775	26.428	13.078	.773
British Assets	33.634	.742	25.302	22.159	.563	Northern American	29.771	.740	25.234	15.796	.696
Broadstone	31.430	.823	28.064	14.151	.780	Scottish American	28.459	.647	22.063	17.976	.571
Capital & National	25.730	.680	23.188	11.151	.765	Scottish Mortgage	24.560	.568	19.369	15.100	.573
Cardinal	32.711	.643	21.926	24.274	.434	Scottish National	30.568	.782	26.666	14.944	.738
Contin. & Industrial	34.983	.972	33.145	11.190	.862	Scottish Northern	35.077	.874	29.803	18.498	.726
Continental Union	31.886	.856	29.190	12.832	.836	Scottish United	27.838	.556	18.960	20.383	.435
Edinburgh Investment	30.840	.791	26.973	14.952	.743	Securities	31.795	.801	27.314	16.274	.724
Electric & General	28.771	.541	18.448	22.078	.388	Sphere	32.298	.857	29.224	13.752	.807
First Scottish American	28.060	.715	24.382	13.888	.719	Stirling	26.079	.660	22.506	13.175	.595
General Consolidated	28.282	.785	26.803	9.025	.857	Stockholders	26.867	.638	21.756	15.764	.515
General Funds	29.263	.688	23.461	17.490	.615	Throgmorton	33.726	.855	29.156	16.952	.748
Glasgow Stockholder	30.794	.774	26.393	15.864	.714	Trans-Ocean	28.771	.724	24.688	14.772	.704
Great Northern	28.104	.802	27.348	4.574	.903	Trust Union	31.385	.854	29.121	11.704	.841
Guardian	34.563	.951	32.429	11.956	.884	UBS	24.258	.642	21.892	10.449	.750
Industrial & General	29.891	.837	28.542	8.878	.836	US & General	28.727	.762	25.984	12.250	.785
Investors Capital	31.704	.685	23.359	23.359	.529	Winterbottom	32.895	.783	26.700	19.214	.650
Lakeview	25.861	.669	22.813	22.813	.725	Witan	29.039	.669	22.813	17.967	.589

- (ii) Similarly the "t" statistics and standard errors around the beta estimates for both equations are also very close.
- (iii) The average total risk and average market risk estimates are considerably less for the ITC portfolios than for the corresponding equities.

As with the portfolio and equity returns we examine whether our averaging hides ranking differences. The relevant Spearman rank correlation coefficients are shown in Table 6(vii).

TABLE 6(vii)

<u>Investment Trust Companies</u> <u>Equity and Portfolio Risk Comparisons</u> <u>50 ITCs : 96 months to 12/80</u>	
Description	Spearman Rho
Total Risk	0.022
Beta	0.109
R^2	0.361

It is clear from Table 6(vii) that very little relationship at all exists between the total and market risk estimates of ITC portfolios and ITC equities. Similar results were reported by Corner and

Matatko. They reported "little relationship" between portfolio and equity betas. In addition they reported that the levels of total and market risk were lower for portfolios than equities. Interestingly we also noted this result in our review of reported market risk coefficients which is summarised in Table 4(iv).

The result that portfolio risk levels are neither related to nor have the same magnitude as equity risk levels is a particularly revealing and indeed surprising observation. Given our comments above on non-trading and the data weaknesses underlying net asset value computation we recognise that reasons for at least part of these differences may be due to data and estimation causes. However we do return in section 3 to consider the implications such differences if valid hold for our understanding of the discount.

- (iii) Portfolio Performance : Two performance measures the Sharpe variability and the Jensen weighted were calculated for the 50 ITCs over the 48 month period to December 1980. The use of the 48 rather than the 96 month period was justified by two considerations. First of all the use of the 96 month period covering as it did the severe bear depression of 1974 resulted in the portfolio performance being assessed against negative risk premium benchmarks. We noted the possible ambiguities that can arise in this situation when we dealt with performance estimators in Chapter 5. Secondly as we were primarily interested in comparing the equity and portfolio performance assessments and in particular given the methodological differences in the computation of risk and return their ranking consistency it was considered reasonable to use the more financially stable later part of the decade.

Equations 4(xvii) and 6(iv) run over the 48 months to December 1980 were used to estimate the Jensen weighted statistic. As before these are presented in cumulative simple return format the appropriate transformation for the portfolio statistic being

$$\text{Jensen Weighted (Portfolio)} = \left[\left[\text{Antilog} \left[\left[\hat{\alpha}_{in} / \hat{\beta}_{in} \right] 48 \right] \right] - 1 \right] 100$$

As discussed in Chapter 5 the use of estimating equation 4(xvii) results in alpha statistics in terms of average daily abnormal returns. Therefore the appropriate multiplier was 1460 rather than 48.

The Sharpe variability measures for the ITC portfolios were calculated as follows :

$$\text{Sharpe Variability (Portfolio)} = S_n = \frac{\sum_{i=1}^{48} \tilde{R}'_{int}}{\hat{\sigma}(\tilde{R}'_{int})}$$

where;

$$\tilde{R}'_{int} = \text{as defined in equation 6(iv)}$$

$$\hat{\sigma}(\tilde{R}'_{int}) = \text{Estimated 48 month standard deviation.}$$

The appropriate market benchmark was defined as;

$$\text{Market benchmark} = \frac{\sum_{i=1}^{48} \tilde{R}'_{mt}}{\hat{\sigma}(\tilde{R}'_{mt})}$$

where;

$$\tilde{R}'_{mt} = \text{as defined for equation 6(iv)}$$

$$\hat{\sigma}(\tilde{R}'_{mt}) = \text{Estimated 48 month standard deviation.}$$

As before the performance statistics are presented in simple return format. The appropriate transformation being:

$$\text{Sharpe Variability (Portfolio)} = \left[\text{Antilog} \left[S_n \right] - 1 \right] 100$$

The Sharpe variability measures for the ITC equity returns and market benchmark were calculated over the same 48 month period using the estimating procedures described in Chapter 5.

Our results are presented in summary form in Table 6(viii) and in more detail in Table 6(ix).

We strongly caution against reading too much into Table 6(viii). The different methods of performance computation, one based on trade to trade returns and the other on monthly returns lies in all probability at the root of the differences between the two sets of statistics. To the extent that comparisons can be made it is clear that a far more favourable performance assessment is given of ITCs when the equity performance is considered.

Perhaps more important than the scale difference is whether or not ranking differences distinguish the two approaches to performance assessment. Corner and Matatko report a rank correlation between equity and portfolio Jensen statistics of .70.⁵ Our results shown in Table 6(x) confirm their findings and also report the high correlation between the different measures a result that is consistent with our earlier findings in this area reported in Chapter 5.

5. D. Corner, J. Matatko, "Investment Trust Portfolio Performance - Measurement and Determinants", Investment Analyst, 1981, pp. 9-13.

TABLE 6(viii)

<u>Investment Trust Companies</u> <u>Equity and Portfolio Performance Summary</u> <u>50 ITCs : 48 months to 12/80</u>										
<div>(%)</div>										
Performance Statistic	Average	Minimum	Maximum	No. of Positive Statistics	No. of Statistics than Market	Average	Minimum	Maximum	No. of Positive Statistics	No. of Statistics than market
Jensen Weighted	6.410	-23.064	-40.656	23	23	-11.356	-32.922	49.634	9	9
Sharpe Variability	118.670	14.668	403.982	50	12	83.108	4.07	390.36	50	6

- Notes :
1. The market benchmark for the Sharpe portfolio index = 194.326%
 2. The market benchmark for the Sharpe equity index with market risk calculated from trade to trade returns = 140.851%

TABLE 6(ix)

<u>Investment Trust Companies</u> <u>Portfolio Performance Measures</u> <u>Jensen Weighted (J) : Sharpe Variability (S)</u> <u>50 ITCs : 48 months to 12/30</u> (%)					
Trust	J	S	Trust	J	S
Alliance Investment	8.14	151.96	London & Holyrood	-19.43	42.43
Alliance Trust	-28.83	9.74	London Provincial	-25.86	18.01
American	3.66	133.31	Monks	-29.72	10.11
Ashdown	-18.07	40.97	Murray Caledonian	-21.14	23.90
Atlas Elec & Gen.	-1.49	155.79	Murray Clydesdale	-24.91	15.18
Berry	26.71	164.64	Murray Northern	-24.76	15.78
Bishopgate	-9.64	102.43	Murray Western	-24.04	18.60
Border & Southern	-11.24	77.30	1928	-22.62	31.59
British Assets	-10.00	54.28	Northern American	-25.47	17.89
Broadstone	-9.56	85.99	Scott. American	36.79	339.95
Capital & National	-15.85	56.50	Scott. Mortgage	-32.92	3.08
Cardinal	15.53	202.65	Scott. National	-16.95	51.44
Continental & Indus.	-21.35	43.52	Scott. Northern	19.90	245.80
Continental Union	-22.03	38.67	Scott. United	-19.94	25.61
Edinburgh Investment	7.62	196.63	Securities	-22.07	31.19
Electric & General	-15.73	47.17	Sphere	-15.95	63.51
First Scott. Amer.	-30.16	59.30	Sterling	-29.04	4.07
General Consol.	-17.28	86.75	Stockholders	-5.32	95.13
General Funds	22.20	231.81	Throgmorton	49.63	390.36
Glasgow St'holders	-15.71	57.00	Trans-Ocean	-17.52	48.59
Great Northern	-15.80	73.03	Trust Union	-7.35	116.41
Guardian	-15.69	68.17	UBS	-21.97	32.76
Indus. & General	-4.77	126.76	US & General	-22.29	33.59
Investors Capital	-29.86	4.55	Winterbottom	-18.71	36.08
Lakeview	-11.05	78.50	Witan	-5.90	51.44

TABLE 6(x)

<u>Investment Trust Companies</u> <u>Portfolio and Equity Performance Measures</u> <u>Ranking Consistency</u> <u>50 ITCs : 48 months to 12/80</u>	
Performance Measures	Spearman Rho
Sharpe Portfolio and Jensen Weighted Portfolio	0.941
Sharpe Portfolio and Sharpe Equity	0.739
Jensen Weighted Portfolio and Jensen Weighted Equity	0.732

Working with a sample of 50 ITCs we have in this section presented a comparison between the financial characteristics of ITC portfolios and equities. As we would expect the respective financial profiles are very similar. The most notable differences were found in comparing total and market risk levels. We suggested that differences in estimation procedures may well account for a proportion of the difference between the higher equity and lower portfolio betas.

With these probable risk differences in mind we turn now to review various reported results on the discount phenomenon.

3. Reported Determinants of the Discount : There have over the years been many attempts at "explaining" the presence of price discounts on ITC and closed end fund equities. While it would be unfair to suggest that we are as far as ever from an understanding of discounts the lack of a strong theoretical base from which to develop empirical tests is an over-riding drawback to work in this area. In the U.K. context we note that most stockbroking firms provide elementary trading rules based on ex post discount movements and the identification of current discount "anomalies". These "anomalies" are best defined in terms of current deviations from historical norms. We noted in Table 6(ii) that average discounts on different ITCs are fairly tightly bunched in the 20 to 30% range. This would perhaps suggest only a limited potential for identifying profitable individual ITC "anomalies". However Thompson working with monthly data from 23 closed end funds between 1940 and 1976

reports that the use of relatively simple trading rules based on the level of discounts at the beginning of each year end with rebalancing at the end of each year would have led to superior returns over those provided by the ex post SML benchmark.⁶ While there is obviously the danger inherent with all work involving trading rules that "a model can always be found to fit ex post data" Thompson is cautious in his conclusions and suggests that methodological weaknesses in particular the adequacy of CAPM as the pricing model for closed-end shares may lie at the centre of his results.

In the U.K. context Thomas and Feldman have reported a profitable "anomaly" model based on the relationship between the discount and a series of variables including portfolio performance, gearing, U.S. exposure, yield and fixed interest exposure.⁷ We suggest that there is little academic merit in the broad empirical approach of Thomas and Feldman. Recently Woodward and Matatko have reported results relating the discount to fifteen variables including management expenses, size, price volatility and performance.⁸ Again we question the relevance of this "shotgun" approach to empirical work. Their results perhaps unsurprisingly fail to provide consistent predictions of discount levels.

More specific attempts at explaining discount levels for the most part centre around various accounting type problems. The argument

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6. R. Thompson, "The Information Content of Discounts and Premiums on Closed-End Fund Shares", *Journal of Financial Economics*, 6, 1978, pp. 151-186.
 7. D. O'D. Thomas, K. Feldman, "The Development of a Model to Explain Investment Trust Prices and Discounts", *Investment Analyst*, September, 1977, pp. 39-51.
 8. R. Woodward, J. Matatko, "Factors Affecting the Behaviour of U.K. Closed-End Funds", *Journal of Business Finance and Accounting*, 94, 1982.

runs as follows. If the securities market is efficient then the pricing of ITC shares will be such that it reflects their expected returns. The observation that portfolio valuations differ from equity valuations is merely a reflection of incorrectly valued portfolios. Two broad categories of estimation difference can be identified - those relating to the management function and those relating to cash flow differences.

The management function is most certainly not included in portfolio valuations. That the market tends to discount the management input by pricing ITC equities at less than portfolio valuations is argued to be the market's assessment on the net value of the management function. Attempts have been made to relate various aspects of this management input to discount levels.^{9,10,11,12,13} These include portfolio turnover, management expenses, trading expenses, performance and portfolio yield. Unfortunately the results are unconvincing. Perhaps the general conclusion is best summarised in terms of the management function being a contributory rather than a complete explanation of the discount.

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9. R. Roenfeldt, D. Tuttle, "An Examination of Discounts and Premiums on Closed-End Investment Companies", *Journal of Business Research*, 1973 pp. 129-140.
 10. K. Boudereaux, "Discounts and Premiums on Closed-End National Funds: A Study in Valuation", *Journal of Finance*, 28, (May 1973) pp. 515-522.
 11. B. Malkiel, "The Valuation of Closed-End Investment Company Shares", *Journal of Finance*, 22 June 1977, pp. 847-859.
 12. M. Mendelson "Closed End Fund Discounts Revisited", Working Papers 1977. Centre for Study of Financial Institutions, University of Pennsylvania Law School.
 13. T. McInish, "Publically Traded Investment Company Discounts and Premiums. *Baylor Business Studies*, 11, 1980, pp. 17-24.

The cash flow explanation of the discount turns on timing differences that are recognized in the equity prices but not in the portfolio valuations. For example contingent claims such as in the U.K. context corporation tax on unrealized portfolio gains and the surrender tax on unrealized foreign securities would not be reflected in net asset values but given reasonably efficient markets we would expect prices to reflect estimates of the ultimate liabilities. Although working with U.S. data and therefore with different accounting and tax regimes Malkiel and Mendelson have both found evidence relating discounts to this form of timing effect.^{14,15} Again however they are insufficient to account for the level of discounts observed. In the U.K. context we note that the two contingent liabilities described above are now no longer necessary given the removal of both exchange controls and taxation on realized portfolio gains. Unfortunately even with their removal discounts show no sign of abating. This would strongly suggest that only a minor role should be ascribed to timing differences.

Both the management function and the cash flow effect are arguments consistent with efficient markets where prices are established through the risk-return relationship described by CAPM. The presence of a discount is merely a reconciling item between all encompassing equity valuations and rather more restricted portfolio valuations. We note that the argument supporting management function as a discount determinant would also allow an explanation for the presence of premiums. Indeed it is quite feasible that the market could ascribe a positive value to a particular management function. The equity

14. M. Mendelson, "Closed-End Fund Discounts Revisited", Working Papers 1977, Centre for Study of Financial Institutions, University of Pennsylvania Law School.

15. B. Malkiel, "The Valuation of Closed-End Investment Company Shares", *Journal of Finance*, 22 June 1977, pp. 847-859.

price would then reflect an additional element equivalent to the valuation of this management effect net of its capitalised expenses.

Unfortunately for these accounting type arguments the fact that it has proved remarkably difficult to complete reconciliations between portfolio and equity valuations would suggest that other factors may be relevant. Similarly if Thompson's results which we reported above are interpreted in the context of CAPM as reflecting the "true" risk-return relationship for ITC equities then the assumption underlying the accounting approach that the market for these securities is efficient would be misplaced.¹⁶

We now turn to three arguments which are strictly incompatible with the two parameter pricing approach. The first suggests that because of transaction costs a demand for diversification services exists but that the portfolios returns being supplied by ITCs are for one reason or another less than perfectly diversified. The result is that the repackaged product is valued at less than the sum of the parts. We suggest that this argument fails to consider the diversification effects of holding a small portfolio of ITC shares. Recall the considerably higher coefficients of determination we reported for portfolios of small, medium and large ITCs as compared to the full sample average of 0.64. See Table 5(xiv). The ease with which even an individual investor could remove the unique risk attached to ITC equities would strongly suggest rejection of this argument.

16. R. Thompson, "The Information Content of Discounts and Premiums on Closed-End Fund Shares", *Journal of Financial Economics*, 6, 1978, pp. 151-186.

The second argument is based on a weakening of the CAPM equilibrating assumption of homogeneous expectations. Zweig for example has suggested that discounts and premiums are caused by differential expectations between (informed) professional investors and (uninformed) non-professional investors.¹⁷ As closed-end fund shareholders tend to be dominated by individuals the equity prices of these funds will reflect non-professional expectations. He argues that widening discounts will occur when these non-professional investors become bearish and that narrowing discounts will be observed when they are bullish. Professional investors on the other hand will not follow the non-professionals into the extremes of bull or bear expectations. On the basis of this Zweig hypothesised that reversals in professional expectations should be preceded by non-professional expectation changes in the opposite direction. Thus there should be a negative relationship between a market-wide price movement and the preceding change in discount levels. Working with 260 weekly observations on 24 closed end funds between 1965 and 1971 Zweig reported that there was following a discount change a ;

" ... high probability that stock prices will reverse towards the unanticipated direction."

In the U.K. context we noted in Chapter 1 that changes in ITC ownership patterns reflected the market wide movement towards institutional ownership. Therefore if anything the ITC ownership group is becoming more informed and more homogeneous perhaps even to the extent that it is now dominated by so-called professional investors. Clearly there may be groups of institutional investors distinguished from one another by expectational characteristics. However we suggest

17. M. Zweig, "An Investor Expectations Stock Price Predictive Model Using Closed-End Fund Premiums", *Journal of Finance*, 28 March 1973, pp. 67-78.

that these differences will not be of a magnitude comparable with Zweig's professional:non-professional categories. In addition we would have expected some reduction in discount levels as the expectational differences between different market participants narrowed. We noted no evidence of such a trend in Section 1 of this chapter. If anything discounts at the end of the decade were on average higher than those in the earlier years. We would suggest then that there is only limited scope for Zweig's expectational differences insight into the discount problem.

Similar arguments supporting an expectational solution to the discount have been put forward by Malkiel among others.^{18,19} Malkiel suggested that discounts reflected investor expectations in much the same way as sales and redemptions by the holders of units in open-ended funds did. Working with data from 24 closed end funds between 1967 and 1974 Malkiel estimated a linear regression with discounts as the dependent variable and net redemptions as the independent variable. As the resulting coefficient although positive was unfortunately statistically insignificant Malkiel could not substantiate the expectational explanation for discounts.

Finally we examine an argument that gained wide exposure during the mid 1970s and which has at first pass considerable appeal. It is suggested that a major cause of the discount is an excess supply of ITC equity over and above the amount demanded by investors. As a result of this excess supply prices drop until a market clearing

18. B. Malkiel, "The Valuation of Closed-End Investment Company Shares", *Journal of Finance*, 23 May 1968, pp. 389-416.

19. E. Miller, "Risk, Uncertainty and Divergence of Opinion", *Journal of Finance*, 22 September 1977, pp. 1151,1168.

level is established. A corollary to the over supply argument is that a reduction in the quantity of ITC equity available would result in the reduction if not the complete removal of the discount.

The sensitivity of the discount to changes in the quantity of ITC equities available clearly depends on the elasticity of demand for ITC equities. Indeed we suggest that the demand curve would have to be substantially inelastic in order that supply reductions could remove discount levels of 20 to 30%. Note also that the not inconsiderable number and size of amalgamations and take overs during the 1970s which we mentioned in Chapter 1 has not resulted in any reduction of average sector discount levels.

Unfortunately while there is no direct evidence on the elasticity of demand for ITC equities what there is for equities in general would strongly suggest a demand curve that is highly elastic.^{20,21} In addition an implication of a relatively inelastic demand curve is that some degree of segmentation exists between ITC equities and the rest of the equity market. The evidence we reviewed in Chapter 2 on the efficiency of the stock market would argue against such segmentation. As with the other arguments reviewed above it is difficult to conclude that an excess supply of ITC equity is a convincing explanation of the discount.

From our review of the various explanations suggested as underlying equity and portfolio valuation differences it is clear that considerable work still has to be done in establishing a firm theoretical framework within which to examine the discount. Following Sharpe and Sosin

20. M. Scholes, "The Market for Securities : Substitution versus Price Pressure and the Effects of Information on Share Prices", *Journal of Business*, 2, April, 1972.

21. P. Marsh, "Equity Rights Issues and the Efficiency of the U.K. Stock Market". *Journal of Finance*, 34, 4 September, 1979.

perhaps the best way forward is to start with a more thorough understanding of the discount's constituent elements.²² For example the key difference we noted earlier between the equity and portfolio returns appeared to centre on the lower levels of risk reported on the portfolio returns. We suggested that estimation difficulties may provide part of the reason although we noted that market risk levels reported by other authors tended to be lower for unit trusts and open-ended funds than for ITCs or closed-end funds. Concentrating on the market risk levels it is interesting to consider the implications that stem from the observed difference in market risk levels being in fact correct. Nothing that co-variance terms are additive then;

$$\hat{\beta}_E - \hat{\beta}_D = \hat{\beta}_P$$

where;

$\hat{\beta}_E$ = Equity market risk coefficient.

$\hat{\beta}_P$ = Portfolio market risk coefficient

$\hat{\beta}_D$ = Implied market risk coefficient on the discount.

The clear implication from this perhaps obvious point is that discount levels tend to move against the market. We noted earlier in this chapter some slight evidence from the December 1974 - January 1975 stock market turn around that this might be the case. Why this should be so is slightly more difficult to establish. A possible reason which would owe more to the importance of the market making function in securities markets than to the risk-return relationship of CAPM

22. W. Sharpe, H. Sosin, "Closed-End Investment Companies in the United States : Risk and Return". Papers and Proceedings of the European Finance Association, 1974.

would be a secondary stock hypothesis. The argument would run as follows. ITC equities are perceived by investors not as a first choice investment but as a second choice. Thus in bull markets it is only after it becomes too expensive to purchase securities directly that investors take the secondary route via ITC equities to their chosen securities. A purchasing switch to ITC equities would result in relatively higher price rises for ITC equities than the portfolio securities with a resultant discount reduction. At the start of bear markets ITC equities are first to go as managers attempt to obtain some insurance against equity losses by going liquid. The choice of selling ITC equities rather than "primary" equities may be partly in a desire to retain as much of the "central" portfolio as possible and partly in the possibility that ITC equities are more marketable at the start of bear markets than towards the bottom. Relatively higher selling pressure on ITC equities as compared to the portfolio securities would result in wider discounts.

We do no more than suggest an investment scenario that is consistent with the negative relationship between the discount and the market. If such a scenario is to have any validity it must first of all be developed theoretically. It may well be that such a theory should centre on the role of the market maker and in particular the stock market's well accepted but rarely examined objective namely to provide liquidity.

Summary : In this chapter we have reviewed discount levels and trends, the financial characteristics of ITC portfolios in the context of a comparison with their equity counterparts and reported on various hypothesised discount determinants. Average discount

levels were noted to be fairly similar for different ITCs but varied considerably over time. The financial characteristics of ITC portfolios were found to be very similar to those of ITC equities with the possible exception of risk levels and in particular market risk levels. Finally we reported that the various explanations of the discount suggested in the literature were not convincing and left an uneasy feeling that the whole question of the discount was being approached from the wrong direction. We suggested that a possible alternative methodology would be to concentrate on what differences could be observed between ITC equities and portfolios. In particular we noted an investment scenario that was consistent with the observed negative discount-market relation and which held out the possibility of theoretical development when considered in the context of two areas not present in the world of CAPM namely market-making and the provision of liquidity services.

CHAPTER SEVEN

CONCLUDING REMARKS

Our examination of the ITC sector during the ten years to December 1980 has covered arguments suggesting a *raison d'etre* for ITCs, the institutional frameworking within which ITC managers had to operate and an assessment of the performance achieved by ITCs during the decade. We argued that two broad categories of intermediation function are open to ITCs. The first involves exploiting the possibility that different market participants are faced with different transaction cost functions in their attempts to gain access to the securities market. In general the access costs are likely to be greater for individual investors than for institutional investors. As this former category of investor are unlikely to hold diversified portfolios their interest in holding an ITC stake will primarily be in order to receive a return flow closely correlated with that of the market. However the increased institutionalisation of the stock exchange has meant that the ITC equity ownership group now consists of a relatively small number of institutional investors. Given the large and well diversified portfolios that these investors hold it is not at all clear that access to a well diversified return flow is the most appropriate service ITCs should be offering this particular group. To the extent that institutional ownership groups insist on this service being provided then there will be significant restrictions on the operational scope of ITC managers. Indeed such management activity that is undertaken will consist in the main of gearing decisions when interest rates allow together with some foreign exposure.

We suggest that during the period from the end of World War II up until the mid 1970s the intermediation services being offered by ITCs were characterised by this "transaction cost" approach. However

from the mid 1960s onwards changes in the economic and institutional environment led to the relevance of this approach being increasingly questioned. In particular individual investors found through the intermediation services being offered by pension funds and insurance companies a more tax efficient route to the securities market. Secondly the high interest rates that characterised the late 1960s and a good part of the 1970s removed the "access to the leverage" justification for institutions to hold ITC equities. It is little wonder then that the ITC sector found itself under increasing pressure to provide a rationale for its continued existence.

Given these pressures together with the level of discounts during most of the decade it is perhaps surprising that more ITCs have not been unitised or taken over. The reasons for this are difficult to specify precisely. However changes in the intermediation service being provided and a greater awareness of the need to market ITC services are undoubtedly contributory elements. We also note that defensive measures such as ITCs holding equity stakes in other ITCs may well have played a part.

We suggested in Chapters 4 and 5 that there was some evidence pointing to a successful re-orientation by several ITCs away from intermediation services based on a "transaction cost" approach towards those based on the production and utilisation of price sensitive information. This re-orientation was characterised by the adoption of what we termed security selection policies. In practice these policies usually involve significant amounts of specialisation. The adoption of such policies certainly allow ITC managers to be seen "to be managing". Indeed individual ITCs may well develop considerable expertise and

knowledge in particular geographic or industrial areas. Thus holding an ITC equity could provide a useful additional element of exposure to an institutional portfolio.

However there are strong reasons suggesting that even this re-orientation of the services provided by ITCs will not be sufficient to allow them to successfully retain an intermediation function. At the theoretical level we noted in Chapter 1 that there is considerable doubt as to whether or not information production alone justifies investment intermediation. It may well be that in the absence of any comparative tax or statutory advantages over other financial intermediaries a whole series of inter-related financial services such as investment advice, insurance, bookkeeping and tax services should be offered to ITC equity holders. Unfortunately there already exist a considerable number of financial intermediaries that offer these services and to suggest that ITCs can successfully expand into these areas is perhaps too optimistic.

A considerably bleaker scenario for ITCs follows from the possibility that risky assets are priced in accordance with CAPM which in turn would imply an extremely strong form of market efficiency. Under such a market regime there would as we noted in Chapter 4 be no role for security selection policies and indeed the management function would be reduced to one of meeting investor risk requirements through levering or unlevering the market portfolio. To the extent that these models are both theoretically valid and are reflected in the real world then institutions may well be less likely to consider an ITC stake in terms of a management function delegated to those with an expertise in producing and utilising price-sensitive information and

more likely to consider it in terms of an opportunistic investment purchased in expectation of the ITCs ultimate liquidation or unitisation.

While we suggest that the most optimistic role for ITCs lies with the production and utilisation of information the theoretical difficulties noted above certainly restrict the extent of this optimism. Unfortunately even leaving aside these theoretical points there still remain a considerable number of practical difficulties that may well hinder attempts to re-orientate the ITC product.

Firstly institutional owners perhaps sensitive to the theoretical points made above may well object to any attempts at change. A recent example of this was the proposed re-organisation of the ITCs under the management of Investment Trust Services. We note that a similar re-organisation was in fact successfully carried out by the Touche Remnant management group who now manage a group of highly individual and specialised ITCs.

Secondly the large size of many ITCs could preclude effective specialisation. For example it may well just not be possible to find a sufficient number of acceptable investment opportunities in a particular area of specialisation to allow successful selection policies to be reflected in superior performance. To the extent that a large ITC counters this shortage by specialising in more than one investment area then it runs the risk of slipping back into a policy of providing investors with a diversified return flow!

Interestingly ITC managers that have chosen to specialise in either small or unquoted companies may well be currently facing this very

problem. Several investment managers have suggested to the author that there is at present a shortage of acceptable investment projects in these areas. This is particularly unfortunate for two reasons. First of all such investments involving as they do both the introduction of elements of illiquidity into portfolios as well as the need for considerable amounts of management time and expertise may not be ideally suited to other intermediaries such as pension funds and insurance companies whose investment policies are perhaps more related to the nature of their ultimate liabilities than to investment search procedures. These institutions may well prefer to control their exposure to this investment area though holding a more marketable and perhaps more easily managed ITC stake. Secondly from the arguments in Chapter 1 on the importance of information and liquidity to the workings of the securities market ITC stakes in these small investment opportunities may well act as a useful "quality signals" in the case of unquoted companies and a source of increased marketability for those companies already quoted. While these effects will be to the benefit of the market as a whole the public good aspects of the information production process may well prevent the full rewards returning to ITCs.

To the extent that there is a role for ITCs in exploiting the types of investment opportunities described above then it is prudent to ask whether the various institutional parameters described in Chapter 2 facilitate this role. We suggest that the importance attached to diversification and quoted securities by both company and tax law as well as the restrictive nature of the internal regulations of many ITCs may act to hinder the full adoption of these new investment policies. However what is perhaps more important and perhaps more difficult to change are investment attitudes. In particular we noted

above the shortage of "acceptable" opportunities in the investment areas of unquoted and small companies. We suggest that to an ITC equity holder protected by the limited liability structure of the ITC "acceptable" may imply a higher exposure to business risk than many ITC managers are willing to take on. The extent to which management attitudes must change is difficult to assess. We suggest that over the sector as a whole it may be considerable.

Thirdly and finally we note that specialisation whether it is geographic, industrial or small company is an area already covered by many unit trusts. It may well be that any disadvantages such as an inability to gear that are sourced in the fiduciary nature of the trust vehicle are more than offset by their already having considerable expertise in a whole range of specialised investment areas.

In conclusion we suggest that the future of the ITC sector is by no means secure. While significant changes have been made to the policies followed by many ITCs it is not at all clear that they provide more than a temporary respite for an investment vehicle that has unfortunately outlived its usefulness.

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